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POPULAR Computing WEEKLY

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It's the best selling weekly

Vol 3 No 43

128K Machine planned by CBM

COMMODORE is working on a new up-market home micro, intended as a direct competitor for the Sinclair QL.

The machine, called the C128, is based on the 8-bit 6502 processor with 128K Ram and a built-in disc drive.

Unlike the 68008 used in the QL which can address 128K of continuous memory, the 6502 can only address a maximum of 64K at on time. With the C128 Commodore gets around this problem by arranging the 128K in two 64K banks either of which can be switched in as required.

When the C128 is first turned on the machine behaves as an ordinary Commodore 64 and is fully compatible with existing C64 software. Hitting a function key swaps to the other 64K Ram giving access to Basic 3.5, the same version of Basic as that offered on the new Plus/4 machine, and an 80-column display.

The C128 is likely to be previewed at the January Consumer Electronics Show in Las Vegas.

Also included w Econet software and the word-processor

Acorn's ABC prices

ACORN'S new ABC range of microcomputers, previewed at this year's Personal Computer World Show, will kick-off at £700, rising to £4,000 for the top-of-the-range machine

For £700 you get the Personal Assistant, technically similar to a BBC machine with a built-in 12 inch black-and-white monitor and single 640K disc drive. Also included is Econet software and the word-processor

continued on page 5 ▶



Frankie steps in

FRANKIE Goes to Hollywood, the top selling pop group with records like *Relax* and *Two Tribes*, are to have a computer program written for them by Ocean Software

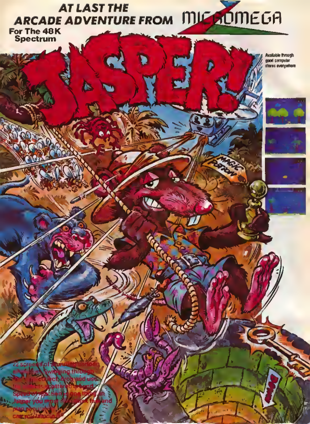
According to Ocean's software development manager the Frankie program is currently at an adanced stage of development "It will take the form of an arcade-style game featuring members of the band as characters within it," he said.

A spokesman for Frankie Goes to Hollywood's record company ZTT refused, however, to confirm the existence of the Frankie computer game: "We have nothing to say to your magazine, whatsoever," he said.

Ocean has in the past been involved in a number of joint ventures linking well-known figures to computer games, most notably Daley Thompson for *Daley Thompson's Decathlon*.

continued on page 5 ▶

SPECTRUM+ REVIEWED


AT LAST THE
ARCADE ADVENTURE FROM MICROMEGA
For The 48K
Spectrum
JASPER!
Available through
good computer
stores everywhere
MAGIC POTION



View

The top home computer manufacturers seem to have lost confidence in their ability to continue to innovate, whilst at the same time staying on top of the heap.

Last week Sinclair announced its Spectrum+ to use the wealth of Spectrum software and hopefully get at those people thinking of buying an Electron, Commodore 64 or Atmos. Clever as a marketing ploy but nothing more.

And there is Commodore's C128 which takes bits and bobs from the Commodore 64 and the Plus/4 adds in a disc drive, to get an interesting bundling job.

But it is almost as though both companies are treading water. Sinclair has been at a loss to understand why the QL's microdrives have not been welcomed with open arms and it is taking a long time for UK software houses to come to grips with the 68008. Commodore on the other hand doesn't seem confident that the Plus/4 will 'knock 'em dead'. Commodore UK's manager Howard Stanworth even warned journalists at the Plus/4 launch against prejudging the machine by adverse press reaction in the US.

So both companies are being cautious. Making the most of their respective software strengths and working out what to do next.

With MSX around the corner, launching a 16-bit home micro may be a necessary — but very risky — gamble for Sinclair.

For Commodore, which has yet to offer a 16-bit machine, the dilemma is all the greater.

The problem is that there is no such thing as a good time to launch a machine which is incompatible with your existing base of software.

If he can continue to sort the company out, watch out for something daring next year from Jack Tramiel's new-style Atari.

POPULAR Computing WEEKLY

Vol 3 No 43

)Presents...

) Futures...

Vic20 Star Game > GST's alternative QL operating system > structured listings on the 64 > and Doodle on Spectrum

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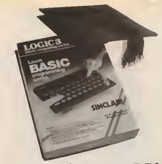
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ABC

96 062 copies sold every week (Jan-June 1984 ABC)

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Computer Trade Association Magazine of the Year



How to teach your Micro a thing or two

Thousands of home computer owners have yet to discover their microcomputer's potential to help with many of the problems and decisions that come up every day in the home or office

Perhaps you have always promised yourself that you would teach yourself programming, but have been put off by manuals which seem to assume a lifetime spent studying computer science and mathematics Maybe you have looked at other computer books, but have yet to find one which is free of unnecessary jargon or where the program examples bear some relevance to real life and not space invaders

Relax, your search is over

The 'Learn BASIC' tutorials from Logic 3 are the latest development of a teaching method pioneered by Professor Andrew Colin and perfected by testing on 3 generations of students at Strathclyde University The 'Strathclyde Method' has been translated into 8 languages and used by over 300,000 microcomputer users

'Learn BASIC' is a jargon free, step by step, course in computer programming, which explains everything clearly in English, not computer talk. In a matter of hours you will be writing your first programs

'Learn BASIC' is designed for people who want to keep abreast of the computer age, for people who realise that understanding computers is a key to future success at work, at school, and as a parent.

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Dragon games row

A ROW has broken out between Dragon software house Impsoft and Touche Ross, solicitors acting as receiver for the failed micro manufacturer Dragon Data.

Touche Ross is refusing to pay the company any royalties on Impsoft's *Fruity* title originally marketed by Dragon Data and now being sold by Touchmaster.

Touchmaster — the new company formed by former Dragon chiefs Brian Moore and Richard Wadman after the Dragon collapse — purchased quantities of Dragon Data software from receivers Touche Ross which it is now selling off at a hefty discount.

"Yet we will see no royalty payment from our title because Touche Ross is claiming that the software sold to Touchmaster was 'distressed stock'. Our *Fruity* title which retailed under Dragon Data for £7.95 is now being sold off for £3.95," explained Impsoft's Norman Silver.

"We have instructed our solicitors to clarify our position and we intend to pursue the matter vigorously."

Christmas micro show scrapped

THE YOUR Computer Christmas Computer Fair has been cancelled.

The fair was to have been held at Olympia on November 30-31.

"We felt that the day of the computer show as an end-user's buying extravaganza are over," explained a spokesman for the magazine sponsoring the show, *Your Computer*.

"No doubt it would have been attended by large numbers of people but it probably wouldn't have made money for the software houses attending," he added.

Thirty-eight companies had booked to attend the show when the decision to cancel was made but, of the major microcomputer manufacturers — Sinclair, Commodore, Acorn, Oric, the MSX companies and Amstrad — only the latter had agreed to exhibit.

ABC prices

continued from page 1

and spreadsheet packages *View* and *Viewsheet*. The Personal Assistant is fully expandable to the top of the ABC range.

The £700 tag will make the Personal Assistant attractive to anyone considering assembling a similar system around a BBC machine.

The flagship of the new range — the ABC310 — will sell for £4,000 with a colour monitor and additional 80286 IBM-compatible second processor, 10M hard disc and a selection of bundled software.

Software movies now from the US

THE IDEA of linking a computer program to an audio tape, first seen in this country with Auromata's *Deus Ex Machina*, is being developed by a number of companies.

Unlike the Automata program, most of the other packages are designed for the educational market where the audio tape contains a spoken commentary on the computer pictures and invites children to answer questions.

American software house Maximus has produced Software Movies aimed at the four to eight age range. The packages, for the Commodore 64 consist of program disc and audio tape. After the program is loaded the tape is played and linked to the computer by pressing the space bar.

Speech on the audio track is matched to the lip movement of a cat called Max.

A Kenilworth-based company, Softlee Systems, is using a similar system on its range of Spectrum educational software. Its three programs, *A Day at the Seaside*, *A Picnic in the Park*, and *Jo Visits the Farm*, all teach simple spelling by associating simple spoken words with pictures. Computer and hi-fi or headphones are linked via a simple lead. This system uses the spare channel on the stereo cassette tape to carry the spoken words but requires the child to stop and start the tape between questions. The price for the tapes is £9.75 each with the lead costing £1.95. More details from Softlee Systems, Freepost, Kenilworth, Warwickshire.

The Maximus Software Movies are not yet available in this country, but the company can be contacted at 6723 Whittier Avenue, McLean, Virginia 22121, USA.

Big-name tape deal

A NEW company, Computer Records has released two impressive software compilation tapes.

Each of the two tapes - one for the 48K Spectrum and one for the Commodore 64 - contains twelve titles and will retail for £12.99.

The two compilation tapes are as follows.

Spectrum. *Hunchback*, *Mr Wimpy* and *Transversion* from Ocean; *Space Intruders*, *Meteor Storm* and *Time Gate* from Quicksilva, *Kong*, *Missile Defence*, and *Moonbuggy* from Anirog; *Pool* and *Spectres* from Bug-Byte, and *Dennis Through the Drinking Glass* from Application.

Commodore 64. *Hunchback* and *Mr Wimpy* from Ocean, *Galaxy*, *Kong*, *Hexpert*, *Skramble*, *Moon Buggy*, *Cosmic Commando* and *Star Base Defence* from Anirog; *Ring of Power* and *Purple Turtles* from Quicksilva and *Dennis Through the Drinking Glass*.

Computer Records is an associate company of Telstar Records.

More budget games titles

SOFTWARE Projects — home of Miner Willy — has launched a range of budget-priced software titles under the label Software Super Savers.

Eight titles have so far been announced — all priced at £2.95 — for the Spectrum 48K, the commodore 64 and the 8K-expended Vic20. They are *Flip Flap*, *Moonlighter*, *Shuttle Shock*, *Ziggurat* and *Fred's Fan Factory* on the Spectrum, *California Gold Rush* and *Faces of Hearne* on the Commodore 64 and *Revenge of the Quadra* on the Vic20.

Pirates get organised

GAMES software houses in the UK now believe that European commercial software pirates are becoming organised.

An International Cracking Agency is now apparently operating, based in Holland, the purpose of which is to circulate recognised software pirates with a 'cracking' disc of software and know-how designed to get round most commercial program protection techniques currently being used.

International organised piracy is now a widespread and serious problem. "It's getting so bad that you can't release a new title slowly through Europe — two weeks after the program is launched in the UK, pirated copies are available in a number of other countries and you haven't got any market left," commented CRL's Clement Chambers.

"If we could find out who is behind this International Cracking Agency they'd be in the Thames with a set of concrete wellies," he added.

PCS folds

PCS — at one time the largest UK software distributor — folded last week.

The collapse, emphasising the depth of the summer slump in the industry, will not make life easier for many of the troubled software houses. PCS still owes over £60 000 mainly to software companies who will now have little hope of recovering the money.

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GRAPHKIT is available on disk and tape Tape version is £1595 and disk version (recommended) is £19 95

All you 1540/1541 disk users **DMON**! is here at last Dmon is the disk monitor you have been waiting for it will allow you to

- read/write blocks from/to the disk
- display and edit blocks on the screen
- display and send disk messages/commands
- transfer your programs from tape to disk or disk to disk or even disk to tape! ● and more!

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PCWK

Letters

Amstrad interest

It is good to see in your pages a little more interest in the Amstrad CPC464 — the only machine capable of preventing a love-hate affair between me and a QL.

P J Long's reporting of the *Mod* function (Letters, October 4 issue) enables a much simplified prime-finding routine

```
10 CLS
20 FOR n=3 TO 1000 STEP 2
30 FOR m=3 TO SQR (n) STEP 2
40 z = n MOD m
50 IF z=0 THEN GO TO 80
60 NEXT m
70 PRINT n
80 NEXT n
```

The *For–To* limits in Line 10 can of course be altered to give other ranges, but it should start with an odd number The program tests for primes at the rate of about 14 odd-numbers per second. It is easily modified to test the various prime-finding formulae which have been proposed from time to time

And now, back to my dongle-less CP464

R J Peter
5 Fitzherbert Street
Warsop
nr Mansfield
Notts

Editing system

I was interested to read in one of your September issues of a way of using the QL *Quill* word processor to write and edit SuperBasic programs using a utility program written by Richard Snowdon.

There is in fact another way of doing this which requires no special utility program, and which uses the *Quill Print* option to print to a file

Several things have to be set up before this system works effectively

The first thing that must be done is for the printer characteristics to be altered by running *mdv1_install_bas* and setting the following parameters

End of line code	<LF>
End of page code	<LF>
Preamble code	1, REM

This provides the correct line terminator for SuperBasic, and puts a preamble on the front of the file which actually gets lost when the SuperBasic program is loaded. If the preamble is not included, you lose the first line of your program

The second thing is that when editing of an imported SuperBasic text is started, the *Design* option of *Quill* should be entered and the following parameters set.

Bottom margin	0
Gaps between lines	0
Page size	0
Start page	1
Upper margin	0

This ensures that no paging characters are sent to the printer file and that page delimiters do not appear on screen while editing

When this is complete, and the text is left justified (the default condition), a loadable SuperBasic program is generated by *Printing current, whole,* out to printer but to *xxxx_bas* where *xxxx_bas* is the file to be created on mdv2_. If the file already exists, *Quill* will ask if you wish to overwrite it

The SuperBasic program *mdv2_xxxx_bas* can then be loaded and run in the usual way

I use this system of editing on my PM version QL.

The system is fairly slow given that *Quill* takes a long time to load itself, and a long time to *Save* and *Print* text and even longer to import a SuperBasic program. The best procedure seems to be to always edit using *Quill* and Save the text at the end of each editing session, periodically printing to produce a file that can be loaded and run, and to not edit the file using the ordinary SuperBasic facilities so as to avoid the need to import the file back into *Quill*

Chris Davis
Bristol BS8

Spectrum network

After reading B Cornill's program on the QL page called *Quantum mechanics* in the August 23 issue I wondered why you could not modify this program to utilise the net on the Spectrum and QL, instead of cutting up the RS232 printer cables (even if it was a free gift from Sinclair)

By changing lines 10, 20 and 25 in the Spectrum program to:

10 Format "n ", 10
20 Open #5, "n ", 5
25 Let A$ = Inkeys #5
type in as a direct command to the *QL*—
Net 5
Open #5, Net 0-10
List #6

I called the Spectrum network station 10, and the QL network station 5 — the above modifications worked with my JM Rom and produced QL listings on the ZX printer — does anyone know if the Rom type makes any difference to whether the net works?

D C Pitts
7 Station Road
South Cerney
Glos

Unofficial bug

Perhaps you will be interested in a genuine bug on the Amstrad — not produced by using unusual variable values, or the like — and which I think ought to be publicised because Amsoft have not officially acknowledged it.

I was trying to think of a name for those who take an interest in bugs, and after a moment's thought decided it was safest to say nothing — "buggies" being a bit lame.

The function Dec$ does not work in Amstrad Basic although it is listed in their concise basic specification.

If you feel like trying it, type it in a program and you will see that the interpreter recognises the word and converts it to upper case but execution will fail with a 'Syntax error" report. Extremely unhelpful and time wasting, if you have spent two hours trying to work out what you had done wrong

It seems this is the reason that the function is not listed in the User Instructions Manual

You can simulate the function to a certain extent with *Right$(Str$(*<numeric expression>) <sub-string length>) But this will not give you the handy formatting features of *Dec$*, eg, automatically getting a "*" in leading empty digit positions

Finally in the hope of keeping the software lads on their toes, it would be nice to have software delivered by promised dates Amsoft's (Tasman written) *Amsword* wordprocessor was on 28 day delivery in July Amsoft have been as helpful as they can be, and said Tasman were going to have it ready to go out by the end of September

An unoptimistic call to them last week received the reply that it was will not out of Tasman's hands Perhaps the Spectrum Plus issue will inspire them

John Mawhood
4 Landford Road
London SW15

Random challenge

I would be interested to hear if anyone has found the same 'bug' which has crashed my game of Psion *Scrabble* for the Spectrum When using the Quit procedure and requesting to continue the game with the same players all I got was 'B integer not of range, 10 11'.

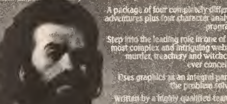
I would also be interested to know from which dictionary the vocabulary the game knows was taken Some of the words appearing are certainly not in any dictionary I can find!

Does the computer challenge at random? The word Qua — a valid word — is used by the computer quite often. But, on the four occasions I have used it the computer has challenged it twice

L T Rees
10 Granville Court
De Beauvoir Estate
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A drop in the ocean

***Graham Taylor** visits the Micro Training Programme which aims to prepare teenagers for jobs in computing*



This Christmas thousands of parents will be bludgeoned, harassed, goaded and emotionally blackmailed into paying anything between £100 and £400 on a micro computer. The gist of most devious arguments from astute teenagers will be the claim that somehow a micro computer is going to help at school, with homework and, most tellingly of all, towards getting a job.

Getting a job is difficult. Despite everything ever uttered by everyone about an inevitable momentum towards a technological age, there are still few opportunities for school leavers in computing. Employers, — those prepared to train school leavers can pick and choose from a large number of worthy candidates.

Giving teenagers an edge in the fight for jobs and helping them discover where their computing strengths lie is the Micro Training Programme — a year long course for 16 and 17 year olds run by the Central London Youth Project. The intention is primarily that the training provided be practical, that students who complete the course should end it with a real chance, not only of getting a job, but of going on to colleges for further training.

I visited the project which is based in Covent Garden and talked to the manager, Steve Jolly about its aims and intentions.

"Although we don't demand any specific qualifications, when we started in June we were clear about one thing — students had to show some sort of motivation towards new technology and we had to be convinced they would last the course."

The centre is equipped with IBMs and Apples rather than BBCs or Spectrums. Why the expensive gear? "When we started there was a deliberate policy decision that we would buy business machines rather than small micros. There are a number of reasons; we wanted a networkable system, running Pascal, which could run the kind of software most used in businesses, such as *Wordstar* and *dBase II*."

The year's course is divided into various sections, designed to cover the most important areas of computing. There are five week blocks covering software, hardware, business applications, a residential course and an important work experience section using computers in a real company.

I wondered what sort of people had joined the course — were there more men than women? Did they have any existing technical skills — did they already own micros and if so was that an advantage? "Well, the ratio is 70/30 in favour of men and that reflects the original applications. I wish it were 50/50, but short of positive discrimination, which has a lot of problems associated with it, there's little we can do.

"In terms of skills whilst some had O levels or CSEs, there doesn't seem to be any special link between those kinds of skills and doing well here — girls tend to get used to the computer keyboard quicker since they've often had some sort of typewriter training already.

"I think a couple of our students have micros, but, whilst it's obviously not a bad thing, there is a general problem — people learn Basic in a very unstructured way and think they know quite a lot, but here they really have to start again. Apart from the fact that we teach Pascal as our main computer language, it's more a matter of approach."

So are home micros really relevant at all? "Well, for our purposes no, but then we aren't here to play games — I usually tell people here not to buy them. Apart from anything else, they don't have much money [Standard weekly pay under the Government's Youth Training Scheme under which this falls is £26.25] and they are free to use the equipment here."

The course is not confined to strict computing matters alone, towards its end there is the task of sorting out work placement which will utilise a student's talents and teaching basic skills like letter writing and interview techniques.

This is Dawn Charles' job. "I think a lot of kids come here with unrealistic expectations about what's possible — you have to help them see that they're not going to jump straight into well paid jobs in computing.

"What I think we can do at the end of it is produce someone who would make a very well equipped trainee or be suitable for more advanced courses. But of course it's a two sided thing; so far as is possible we try to guide the students towards what they feel they want to do.

"The work experience section of the course starts in February and all in all I suppose we've been pretty lucky. People like Esso, IBM, the GLC, as well as local firms have all offered jobs at the end of it."

The centre has charity status and is funded by a mixture of donations and various government grants. There are plans to develop it further, by introducing evening courses for 16 and 17 year olds who would receive instruction in basic computing topics and gain hands-on experience with the machines.

There are three further developments planned for the centre, a word processing bureau, a computer consultancy and possibly, but less certainly, a micro-shop. Some of the profits from these operations would go towards the micro-training program, but the hope is that successful entrepreneurs will come in to run the operations, investing their own capital and taking a share of the profits. The entrepreneur would gain certain advantages like access to a lot of useful computer information and a rate-reduced site in Covent Garden. Solvent and proven wiz kids should apply direct.

Said Dawn, "Next year we're hoping to take a slightly higher number of students and get more equipment, but I should stress that we're full up for the time being and, anyway, have to give priority to local young people in the Covent Garden area. What we do need is support from manufacturers, we have some but we always need more."

Manufacturers and other people interested in supporting the Micro Training Programme should contact them at 99-103 Long Acre, Covent Garden, London WC2E 9NR, tel 01 240 8377. There are no vacancies on the scheme for students at present.

Ingenious...





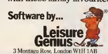




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The Spectrum (+) Connection

Cattapilla

Wander around the garden eating as you go....but watch out for Sammy Snake in Cattapilla for the BBC or Electron by Colin James

The program is in two parts, the first part containing instructions, the second program containing the game *Cattapilla*. It is a version of the old favourite, where as 'Catty Caterpillar' you wander around the garden, eating food, getting longer as you eat, ensuring you don't cross your body and avoid hitting any of the walls.

This is relatively straightforward, until the third and subsequent screens, when you have to avoid Sammy Snake, who will also be wandering around the garden.

Also on view during the game is on-screen scoring, the high score and the name of the person with the high score. A score over 500 can be considered very good.

Type in the first program, and save it on tape with *Save "Cattapilla"*. Then type in the main program, and save it on tape after "*Cattapilla*" with *Save "Catty"*. Then load and run the first program with *Chain "Cattapilla"*. The main program should automatically load and run after you have read the instructions.

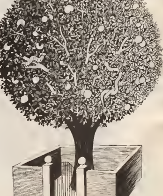
Program Notes

10-20	Program will automatically run if *Break* or *Escape* keys pressed.
30	Sets initial colours
40	Switch off flashing cursor
60	Moves cursor to top right of screen
80-260	Instructions
300-330	Puts a value into variable (D%) depending on which micro is used
340-430	Displays the movement keys, & *Chain's* the main program
20-190	Main program loop
200-290	*Procwall* — draws the wall and garden, puts up score, high score and high scorer
300-420	*Procscreenone* — draws the additional obstacle walls, which appear after the first screen
430-480	*Procscreentwo* — draws Sammy Snake at the start of screen three and all subsequent screens
490-510	*Procblocker* — moves Sammy Snake
520-680	*Procmove* — general movement routine
630-690	*Procinitialise-all* — sets the initial variables and conditions at the start of every screen
700-730	*Prochead* — draws Catty's head, if there is no obstacle in its path
760-810	*Proctail* — moves Catty's tail
880-900	*Procfood* — draws the food on the screen.
910-960	*Prochit* — if the caterpillar moves on to an obstacle this routine decides which obstacle has been hit.
970-1020	*Prochitwall* — called when Catty hits a wall, to end the game.
1030-1080	*Proceatself* — as *Prochitwall*, but called when Catty tries to cross his own path
1090-1200	*Procscore* — prints up score at end of a game. If it is a new high score, allows you to enter your name
1210-1230	*Procpause* — gives a pause of about three seconds
1240-1350	*Procuser-graphics* — sets up the user defined graphics, and line 1350 switches off the cursor
1360-1370	*Prochitsnake* — as *Prochitwall*, the called when Catty tries to cross Sammy's path
1380-1380	*Procinitialise-once* — sets up initial variables
1470-1510	*Procnewscreen* — called at the end of each screen.
1520-1530	Function which returns the colour of a specific point on the screen

The data statements from Line 1540 onwards should be copied carefully as they contain movements of Sammy Snake.

Lines 10 and 20 from the first program, and Lines 20 and 30 from the main program may be omitted initially so that the *Escape* and *Break* keys both work as expected.

Program 1 — Save as "Cattapilla"
Main Program — Save as "Catty"



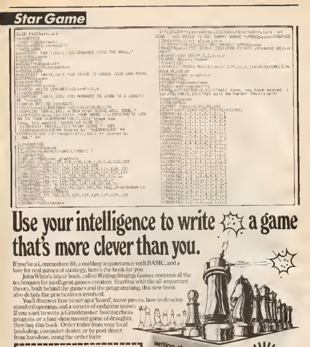
```
10ON ERROR RUN
20*TV0:CLS MRUNIN"
30MODE2:COLOUR131:COLOUR1:CLS
40VDU23,1,0;0;0;0;
50VDU[illegible]
60PRINTTAB(2,3) "** CATTAPILLA **"
70COLOUR1
80PRINTTAB(2,7);"Cathy Cattapilla" moves cont[illegible]ously
90PRINT" around the garden"
100PRINT" looking for food"
110PRINT" However he must"
120PRINT" be careful to avoid"
130PRINT" his own body and"
140PRINT" the walls "
150PRINTTAB(2)"Later on you will"
160PRINT" also have to avoid"
170PRINT" Sammy Snake He is"
180PRINT" very curious and"
190PRINT" will wait for you"
200PRINT" to pass if he gets"
210PRINT" stopped b[illegible]"
220PRINT" the food,but he"
230PRINT" gets upset,and it"
240PRINT" is the end of the"
250PRINT" game if you cross"
260PRINT" his path "
270COLOUR1
280PRINTTAB(2,[illegible]) Press a[illegible] [illegible] to continue [illegible]:A$=GET$:
[illegible]VDU28,0,[illegible] 19,5 CLS
290COLOUR1
300PRINT TAB(5,10)"--PRESS-
310PRINT TAB(2,15)"[illegible]";COLOUR1;PRINT "B";COLOUR1;PRINT"" FOR B B C "
320PRINT TAB([illegible],18)" ";COLOUR1;PRINT "E";COLOUR1;PRINT" FOR Electron
330key$=GET$:IF key$ "D" AND key$ [illegible] THEN [illegible] ELSE OC=ASC(key$):CLS
340PRINT:PRINTTAB(5): CONTROLS: "
350PRINT:PRINT:PRINTTAB([illegible]) A UP"
360PRINT:PRINTTAB([illegible]) Z DOWN"
370PRINT:PRINTTAB(2): LEFT"
380PRINT:PRINTTAB(2):" . RIGHT
410VDU28,0 "1 19,[illegible]CLS
420VDU30:COLOUR1:PRINT" START THE TAPE"
430VDU28 0 "1 19,[illegible] CHAIN"LAT[illegible]
```

```
10REM***CATTAPILLA***by [illegible]
20ON ERROR RUN
30*TV[illegible]OLD [illegible]RUN
40MODE1
50PROCinitialise_[illegible]
60screen[illegible]=0:[illegible]total[illegible]=0 score=[illegible]gain=25
70PROCinitialise_all
80PROCwall
90PROCfood
100COLOUR[illegible]
110REPEAT
120IFscreen[illegible] THENPROCblocker
130PROChead:*FX[illegible],1,5
140IF N[illegible]=0 THEN PROC[illegible] [illegible]
150UNTIL CRASH%=1OR[illegible]screen[illegible]
160IF CRASH% [illegible]1 THEN 70
170PROCscore
180PRINT TAB(8,[illegible]);"[illegible] key to pl[illegible] again"
[illegible] GET:GOTO60
190END
200DEFPROCwall
210COLOUR2:COLOUR128:CLS:PRINTTAB(4,0); SCORE = [illegible]
total%;TAB(17); HI-SCORE [illegible]HS%
220hilength=LEN"** Hi score by "+LENN$+LEN " **":PRINT
TAB((40-hilength)/2,31)"** Hi-score by "[illegible]
[illegible]COLOUR[illegible]
240PRINTTAB(0,1);STRING$(20,CHR$22[illegible]+CHR$[illegible]CHR$22[illegible]
STRING$(19,CHR$224+CHR$225):VDU227,226,22[illegible]
250FOR [illegible]=10 TO [illegible]:VDU31,[illegible],N,[illegible],226,[illegible]1,38,
N+1,2[illegible] 2[illegible],226,[illegible].NEXT
260VDU[illegible]:PRINTSTRING$([illegible]CHR$224+CHR$225[illegible]CHR[illegible]
STRING$(20,CHR$224+CHR$[illegible]5).
270VDU28,2,2[illegible],COLOUR[illegible]1[illegible]
280IF screen[illegible] THENPROCscreenone
290ENDPROC
300DEFPROCscreenone
310sc%=sc%-1
320COLOUR[illegible]:COLOUR1[illegible]
330PRINTTAB(11,7),CHR$[illegible];CHR$[illegible],TAB([illegible]),CHR$[illegible]9;
CHR$227
340PRINTTAB 11,8),CHR$[illegible],CHR$[illegible]TAB([illegible],8);CHR$[illegible]27,
CHR$224
350PRINTTAB 11,9),CHR$[illegible],CHR$226,TAB(2[illegible] 9),CHR$[illegible]
CHR$227
360PRINTTAB(11,10),CHR$[illegible]CHR$[illegible]TAB(27,10),CHR$227
;CHR$225
[illegible]PRINTTAB([illegible] 11 [illegible]VDU[illegible],224,225,224,225
[illegible]PRINTTAB(2[illegible],11);VDU224,225,224,225,224,[illegible]5,226[illegible]
[illegible]PRINTTAB(11,1[illegible] VDU[illegible],[illegible]1,[illegible],224,[illegible]
[illegible]PRINTTAB(23,1[illegible]),VDU[illegible]7,[illegible]4,225,224,225,224,2[illegible],226
[illegible]PRINTTAB(11,2[illegible]);CHR$[illegible]STRING$[illegible]CHR$[illegible]4+CHR$[illegible]5
;CHR$229
400PRINTTAB(11,[illegible]);STRING$ [illegible]CHR$224 CHR$225)
410COLOUR2 COLOUR1[illegible]
420IF screen [illegible] THENPROCscreentwo
430ENDPROC
440
450DEFPROCscreentwo
460lensna%=7:screen[illegible]IF lensna[illegible]THENlensna%=7[illegible]
470wait%=wait% 4,G%=[illegible]:H%=[illegible]J%[illegible]B.PLACE%=[illegible]TALE%=
TRUE.FORinitial%=1TO lensna%:VDU31,G%,H%,2
```

```
[illegible] PLACE%=(PLACE%+1)MOD249 PROC[illegible]H%,A%(PLACE%),1[illegible]
[illegible]NEXT
480ENDPROC
490DEFPROCblocker
500IF FNpoint([illegible],G%,H[illegible]) [illegible]THENENDPROC ELSEVDU31,G%,H
2[illegible]PLACE%=(PLACE%+1)MOD250:PROCmove(G%,
H[illegible],A%(PLACE%),1)
[illegible]TALE%=(TALE%+1)MOD250 PROCmove [illegible]%,[illegible],A%(TALE%)[illegible]
VDU31,1[illegible],1[illegible],32 ENDPROC
520DEFPROCmove(X%,Y%,Z%,B[illegible]
530ON[illegible] GOTO 54[illegible],550,560,570
540X%=X%+1 GOTO580
550Y%=Y%-1 GOTO580
560X%=X%-1 GOTO580
570Y%=Y%+1
580ON B[illegible]GOTO 590,600,610,620
590G%=X%:H%=Y%:ENDPROC
600[illegible]=Y%:ENDPROC
610[illegible]=Y%:ENDPROC
620[illegible] ENDPROC
630DEFPROCinitialise_all
640tX=14 tY=15:AX%=1[illegible]:A[illegible]=[illegible]14:N[illegible]=16.NI%=0 FOOD
%=0 head%=2.tail%=0:IF gain%<226 THEN gain%=gain%+15
650IF [illegible] THEN wait% [illegible] ELSE wait%=4
660[illegible]
670FOR[illegible] [illegible] 2 [illegible].NEXT
680*FX[illegible]
690ENDPROC
700DEFPROChead
710[illegible]head=head + 1MOD[illegible]5[illegible]
[illegible]2ANDCM%=55)+(3ANDCM%=44)+(4ANDCM%=[illegible]):IFCM
[illegible]
[illegible]
[illegible]head [illegible] IF FNpoint(10,t[illegible],tY[illegible]) [illegible] THEN PROC[illegible]
[illegible]
[illegible]IF NI[illegible] THEN NI%=NI%[illegible]total%=total%+1:COLOUR1[illegible]
PRINT TAB(1[illegible],0);total%.COLOUR131:IF total [illegible]score THE
PROCnewscr[illegible]
[illegible]ENDPROC
[illegible]DEFPROCtail
7[illegible]REM *** ERASES TAIL ***
[illegible]COLOUR1[illegible]:VDU31 AX%,A[illegible]
[illegible]PROCmo[illegible],AY[illegible],cat%(tail%)[illegible],4
800tail = tail+1)MOD255
810ENDPROC
820DEFPROCfood
[illegible]NI%+FOOD[illegible] SOUND1, 15,100,5
[illegible]
850IF FNpoint [illegible] THEN840
860IFXF=tX ANDYF=tY THEN840
870[illegible]COLOUR131
880 FOOD[illegible] RND([illegible]):VDU31,XF[illegible],2[illegible]8
890COLOUR2
900ENDPROC
910DEFPROChit
[illegible]point=FNpoint([illegible]):IFpoint=0THEN [illegible]
ENDPROC
930SOUND1, 15,40,1[illegible] SOUND1,-15,27[illegible]
940IFpoint=1THEN PROC[illegible]l ENDPROC
950IFpoint=[illegible] AND FNpoint(6,tX[illegible] THEN PROCeatself
```

Continued over the page

Star Game



```
ELSE PROChitscale
[illegible]ENDPROC
[illegible]DEFPROChitwall
90[illegible]CRASH%=1:screen%=[illegible]
[illegible]COLOUR[illegible]
1000PRINT TAB(7,16); "YOU CRASHED INTO THE WALL."
1010PROCpause
1020ENDPROC
1030DEFPROCeatself
1040CRASH%=1:screen%=0
10[illegible]COLOUR0
1050PRINT TAB(4,16); "YOU TRIED TO CROSS YOUR OWN PATH."
1070PROCpause
1080ENDPROC
1090DEFPROCscore
1100FOR N=1TO 250:NEXT:CLS:*FX21,0
1110COLOUR0
1120PRINT TAB(1,12); "YOU MANAGED TO GROW TO A LENGTH OF ";total%
1130FOR N=1 TO 100:NEXT
1140IFtotal%>HS%THEN HS%=total%ELSE1170
1150PRINT TAB(6,14); "A NEW HIGH SCORE,WELL DONE "
1160PRINTTAB(6,16) "ENTER YOUR NAME ";:INPUTN$:IF LEN N$>15 THEN CLS:PRINTTAB(7,22);"(name too long, try again)":GOTO1160 ELSE CLS
1170PRINT TAB(1[illegible],15);"HIGH SCORE - ";HS%
1180length=LEN "** Scored by "+LENN$+LEN" **"
1190PRINTTAB((40-length)DIV2,18);"** Scored by ";N$;" **"
1200ENDPROC
1210DEFPROCpause
1220TIME=0:REPEAT:UNTILTIME=[illegible]
[illegible]ENDPROC
1240DEFPROCuser graphics
1250VDU 23,224,255,128,128,128,128,128,128,255
1260VDU23,225,255,1,1,1,1,1,1,255
1270VDU[illegible],2[illegible],129,129,129,129,129,129,129,[illegible]55
1280VDU23,227,255,129,129,129,129,129,129,129
1290VDU23,240,60,126,255,255,255,255,126,60
1300VDU23,241,60,126,90,90,126,126,60,0
1310VDU23,[illegible],24,161,165,189,165,82,84,56
1320VDU23,230,24,102,90,189,189,90,102,24:REM*SNAKE*
1330VDU[illegible],8[illegible]0;0;0;
1340VDU23,229,255,129,129,129,129,129,129,255
1350ENDPROC
1360DEFPROChitsnake
1370CRASH%=1:screen%=[illegible]COLOUR0:PRINTTAB(4,16); "OH DEAR YOU TRIED TO EAT SAMMY SNAKE ";PROCpause:ENDPROC
1380DEFPROC[illegible]
1390PRINTTAB(15,12); "GET READY!":PROCpause
1400DIMcat%(255):DIM[illegible](250):FOR A%=0TO 249:READ A%[illegible]:NEXT
1410HS=100:VDU19,3,2,0,0,0
1420N$="Mickey Mouse"
1430[illegible]
1440*KEY[illegible] MODE[illegible]M VDU17,0,17,129,23,1,0;0,0,0;0,0;MCLS M VDU14 MLIST M'
1450PROCuser graphics
1460ENDPROC
1470DEFPROCnewscreen
1480screen=screen%+1
1490CLS:PRINTTAB(5,12);"Well done, you have scored ";total%;TAB(5,15);"*it will be harder this time*"
1500PROCpause
1510ENDPROC
1520DEF FNpoint(L%,S%,R%)
1530=POINT(32*S%+1[illegible],([illegible]-T%)*32+R%)
1540DATA2,2,2,1,1,1,1,2,2,1
1550DATA1,1,4,1,1,1,4,4,3,4
1560DATA1,1,2,1,1,1,4,4,4,4
1570DATA4,1,1,1,1,2,1,1,4,4
1580DATA4,4,1,1,1,1,1,1,1,1
1590DATA1,1,4,4,4,[illegible],3,4,4,3
1600DATA[illegible],[illegible],4,4,4,4,[illegible]
1610DATA3,3,2,[illegible],3,3,[illegible]
1620DATA3,4,4,4,4,4,3,3,2,[illegible]
1630DATA[illegible],4,4,[illegible]
1640DATA3,3,3,[illegible],3,[illegible],3,4,[illegible]
1650DATA2,2,2,[illegible],2,2,1,1,1
1660DATA1,2,1,2,1,1,[illegible],1,1,1
1670DATA1,1,2,1,1,1,1,2,2,2
1680DATA2,1,1,1,[illegible],3,2,[illegible]
1690DATA2,[illegible],2,1,[illegible],1,2,1,4,1
1700DATA4,4,1,1,2,1,1,1,1,1
1710DATA2,2,1,1,1,4,4,4,1,1
1720DATA4,4,4,[illegible],3,3,4,4,4
1730DATA4,4,4,[illegible],3,3,3,[illegible],4
1740DATA3,4,3,3,[illegible],3,3,4,4,3
1750DATA3,[illegible],4,[illegible],2,2,2,2
1760DATA2,[illegible],4,4,4,[illegible],2
1770DATA3,[illegible],3,[illegible],3
1780DATA2,2,2,1,1,[illegible],1,1,2
```


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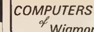
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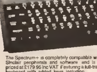
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Machine Spectrum+ **Price** £179.99 **Supplier** Sinclair Research, 25 Willis Road, Cambridge.

The major novelty of Sinclair's new computer is that it is available in high street shops now.

But then if that were not the case the whole exercise would have been pointless.

The market for home computers has become notoriously seasonal, with the majority of sales occurring in the weeks before Christmas. The task of the Spectrum+ seems to be to steal sales from the Commodore 64, Acorn Electron, Oric and, perhaps, the Amstrad.

I will be very surprised if it does not succeed. For £179.99 you get a computer that has a reasonable keyboard and whose slightly outdated specification is more than compensated by its huge software base. Six programs, including the excellent word processor package *Tasword Two* and *Scrabble*, are included in the price and, contrary to some press speculation, the Spectrum+ can use all the peripherals designed for the original model.

There are only a few differences between the Spectrum and the Plus, and only one that really matters. The technology used to produce the QL keyboard has been employed to give a "real keyboard" to the Spectrum, 57 keys and a space bar adorn the top of a new, larger casing which measures 12.5 by 6 by 1.5 inches. I still find the Spectrum+ a small machine, but it certainly is more substantial than its predecessor.

To give credibility to my judgement of the keyboard I am writing this review on the machine itself, using *Tasword* Two. I have entered some fairly long programs on the QL's keyboard, and the Spectrum+ has the same 'soft-but-noisy' action. You get used to it, but a few moments spent using something with a 'proper' switch mechanism soon puts

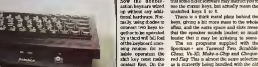


the membrane arrangement into perspective.

It is not just the tactile qualities of the new Spectrum keyboard that have been improved. the extra keys mean that less gymnastics are required to program and write. The old keying sequences will still work, although they are no longer marked. The cursor keys are placed either side of the space bar there are also pairs of shift keys either side, with caps shift boasting double-sized keytops. The other additions are *Extend, Edit Break, True Video* and *Inverse video, Graphics, Caps lock*, and the punctuation marks except colon, delete and break.

These last two are oddly positioned — the break key is where most micros have their delete keys, top right, while Sinclair place the delete key almost where you would find escape or break on other machines, top left.

Interestingly, I tried the new keyboard and case fitted onto my old Spectrum and there were no problems. Anyone who has attempted to attach a conventional keyboard to their Spectrum may wonder how the double-action keys are wired up without any additional hardware. Normally, using diodes to connect two keys together to be operated by a third will fall foul of the keyboard scanning routine. for reliable operation the shift key must make contact first. On the new keyboard this is achieved mechanically by the membrane under the keys.



Two more improvements are visible on the Spectrum+. A reset button has under the left-hand edge, a welcome addition but perhaps a little dangerously placed.

Also, the whole computer can be tilted with the aid of two retractable feet under the back of the machine. They position the machine at a comfortable angle, and snap in and out very positively — opening up the case revealed that the springs are actually made of plastic.

Not much else of interest is found inside as the circuit-board is standard Spectrum issue (4B actually).



Obviously, therefore, there will be no problems in running Spectrum software — the one pendantic point that I can think of is that some older software may instruct you to use the cursor keys, but actually mean the unshifted keys 5 to 8.

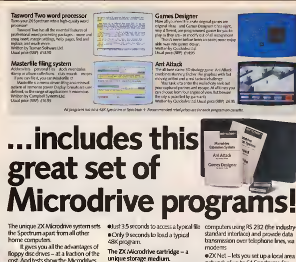
There is a thick metal plate behind the keys, giving a bit more mass to the whole affair, and the extra space and slots mean that the speaker sounds louder; so much louder that it may be irritating to some.

The six programs supplied with the Spectrum+ are *Tasword Two, Scrabble, Chess, Vu-3D, Make-a-Chip* and *Chequered Flag*. This is almost the same selection as is currently being bundled with the old Spectrum as a 'six-pack' special offer except that *Tasword* and *Vu-3D*, replacing *Horace Goes Skiing* and *Survival*, gives the

Continued on page 23



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Machine review

Spectrum+ programs a more serious slant.

Overall impressions are of a stylish and fairly solid computer, still not as substantial as the CBM 64, but in the same class. Unfortunately this image is spoilt if you turn the machine upside down and a number of the key tops fall off! That could be a little annoying.

The manual that many Spectrum owners have come to know and love has — with the Spectrum+ — been replaced by an altogether more glamorous book. Using colour photographs and illustrations, it deals with the fundamentals in great detail. There are a number of simple routines to show off the graphics and sound and then a reference section for the Basic commands, while the few remaining pages gloss over machine-code and computing in general. This leaves the back cover on which to advertise some Basic programming books from the publishers of the manual.

Information not included in the new manual includes details of system variables, memory formats and the op codes attached to the character set table.

Overall the new manual reminded me of those glossy instructional books about DIY and car servicing: very good up to a point but a little patronising.

The new welcome tape — a replacement for the Psion *Horizons* tape — falls into much the same category: very hot on the graphics but somewhat shallow. Side A contains a keyboard trainer with very good screen displays. If you break into the program a remark warns you that it is not an example of structured programming "it is just meant to work". I broke in to find the bug that, when I had scored 100% on the graphic keys section, told me I needed more practice! The B-side contains only one program but that contains two enjoyable games and an excellent user-defined character generator, the results of which can be fed into one of the games, *Maze Chase*.

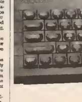
So — the Spectrum+ is more a good example of marketing and repackaging, than a wildly innovative product.

For my money, I would have liked to see either Interface 1 or 2 built in to the new computer, but then it would never have been ready for Christmas.

The current price difference between the Spectrum and the Spectrum+ of £50 only makes sense if you believe that the software currently being bundled with the Spectrum (the six-pack) is a special offer and that the six programs with the Plus is a permanent part of the package.

Nevertheless the Spectrum+ should bolster Sinclair sales considerably this Christmas and, after eclipsing the old Spectrum model, will probably take its place.

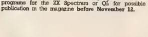
Jeff Naylor

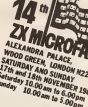


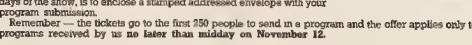
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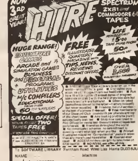
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Touching

Program *Backtrack* **Micro** Dragon 32 **Price** £6 95 **Supplier** Incentive Software, 54 London Street, Reading, Berks

This is a maze game for one, in which the player steers Eddie through the labyrinth. In order to escape, he has to pick up four keys in sequence and then find the exit door before his dwindling will-power is used up



To assist him there is a map of the maze if he can find it and some items of fruit to revitalise his willpower To make life difficult there are snakes in other rooms of the maze which may or may not be lethal and a genetically mutated rug with nasty habits.

Control is by the arrow keys or by any other keys which the player nominates The display is very good, being a bird's eye view down into the maze with 3-D perspective Outside walls have windows which helps orientation except that some mazes have interior walled gardens The sound of Eddie's running feet as his willpower drains away is quite touching.

This is a game of patience and endurance. The supplier's guide time for the first game is eight minutes and for the fifth is 40 minutes They either regard the game as insoluble or have great faith in their sales, for the package includes a competition with a prize of a Cumana disc drive for which the entry qualification is to know what Eddie does after completing Test 5. So far, that prize is nowhere near my grasp.

Derrick Trueman

Gruesome

Program *Red Sky over Accrington* **Price** £6 95 **Micro** BBC B **Supplier** Vampyre Software, P O Box MT15, Leeds, LS17 8DW

Red Sky at night means it went off all right! The game *Red Sky Over Accrington* begins on 1st July 1985 and over four days the newspaper reports gradually worsen until nuclear war starts

Red Sky is a kingdom style game where you have to out-guess the computer on the correct proportions of supplies, food, drugs, and access to shelter to get hold of The scenario is gruesome but the horrible fascination has in trying to imagine how values would change in such a situation. What price gold? What price an anti-radiation drug?

You have a choice of actions such as 'move', 'visit casino' and 'buy shelter' but there is only a limited number of these activities before your time runs out. There are simple graphics and a choice of city, mountain, river-bed or grassland landscape, with varying hazards on them including fire, flood, earthquake, infection and mutants.

If you can overcome your horror at the situation, it is a competent strategy game, but its sale is probably limited to those who will enjoy its sensationalism

Jan Watterson

Outsider

Program *Racing League* **Micro** Spectrum **Price** £2.90 **Supplier** Racing League Software, 32 Lindale Garth, Kirkhamgate, Wakefield, W Yorks

'Ullo, John — want to buy a race horse? Or three of them? *Racing League* lets you join H Copper M Thatcher, HM Queen and others in the Sport of Kings

There have been several racing games for the Spectrum, none of which is a Derby winner, but even in such an uninspired field this maiden should be despatched directly to the knacker's yard!

They're off — *Racing League* with a '0 OK, 0 1 message Only a donkey won't *Run* without prodding! To be fair, the screens that follow have reasonably clear instructions and error trapping

But if endless Entering, tables and weighted randomisations were all that the turf had to offer Brough Scott would be out of a job Player choices are minimal and, if you should win, the first you will know of it is the result — there are no graphics

The letter accompanying the review copy speaks of this as the basis for exciting enhancements to come They should be part of the program now

Cheap as it is *Racing League* is worse value than backing a rank outsider At least that could give you a moment's excitement for your money

John Minson

Evil force

Program *Heroes of Karn* **Micro** Commodore 64 **Price** £7 00 (cassette) £9 00 (disc) **Supplier** Interceptor, Lindon House The Green, Tadley, Hants.

Heroes of Karn is described as a graphical adventure with music.

In fact, it is a pretty standard text-based adventure game with hi-res pictures accompanying each scene, with occasional snatches of music at some of the locations. The setting of the adventure is in some indeterminate historical fantasy world in which the Empire of Karn has been over-run by the Powers of the Night, including dragons, vampires, and other obligatory nasties. Only four of the Heroes of Karn have survived, and they have all been taken captive by the evil forces Your quest is to free them, and recover the treasures of the Empire

The game is structured in the usual adventure style, with a reasonable number of locations and hazards. The program seems to understand quite a large vocabulary of commands and objects, and even allows you to give instructions to other characters, who will carry them out if they are willing The graphics provide illustrations of the locations, but they do not enter into the game directly Although they are quite well done, they are painfully, achingly slow to draw Fortunately, they only appear on your first visit to each location.

It is a quite challenging adventure with enough locations and other characters to keep you occupied for some time. It is perhaps best to think of it as a text adventure and regard the graphics as a nice extra feature. But they're so slow

Richard Corfield

Merlin's out I'm Grymalkin, he sent me to help you
Go east to get out of the tower but we ought to find a compass first.

Adventure

Program *King Arthur's Quest* **Micro** Spectrum **Price** £7.95 **Supplier** Hill MacGibbons, 92 Fleet St., London EC4

Here is a very playable, complex and addictive adventure both challenging the mind and requiring quick reactions at times. There are eight areas to explore during the game, and each has its own perils and opportunities.

The graphics are generally good, and the comments helpful. With the cassette comes an instruction booklet and a wall poster containing relevant history and a code chart. All play is by single key press, except for spells which you type in full. Without giving too much away, I can say that it is worth your while to explore each area fully before moving on, and to write down everything you are told, no matter how useless or odd.

The game is identical each time you play, so making a map is a very worthwhile activity. It was crash free during testing though the move commands sometimes seemed a little odd — or perhaps my mapmaking was at fault! There is a "Save" option, enabling you to start from half way through if you are killed off during a game, and I should mention also the facility to back up the game to Microdrive.

I really enjoyed *King Arthur's Quest*, and I'd recommend it as good value for money for games users who want a new challenge, and more serious users who like a bit of light entertainment from time to time. This program works the mind as well as the fingers, and should be a success in the run up to Christmas.

Simon Springett

Scrabble

Program *Scrabble* **Price** £12.95 **Micro** BBC B **Supplier** Leisure Genius Retail

I can't help wondering how many PhD theses have been turned into successful computer games. This is one. Peter Turcan created it while researching word structures. The game caused a sensation when released on Sinclair machines a year or so back. Now, despite memory restrictions, it is here on the BBC B.

The game itself is standard *Scrabble* — a board game using letters set out in turn by each player and forming intersecting words rather in the manner of crossword puzzles. Various scores apply to each letter and to special positions on the board.

The micro version replaces board and loose tiles with a screen display. The colour of board and tiles can be modified to find the selection which best suits your screen. Up to four players can take part and any of them may be the micro itself.

The cleverest part is the word checking. The micro can check 8 000 words from its own store. If it fails to recognise a word it asks you to verify it. The game plays well and quickly with all the facilities you can enjoy with a board version.

It is quite fun but one has to ask why — unless you are a compulsive *Scrabble* player isolated on a remote island — you would want to play with your Beeb rather than a fellow human?

Dave Watterson

Jet-BBC

Program *Jet Pac* **Price** £8.95 **Micro** BBC B **Supplier** Ultimate, Ashby Computers & Graphics, The Green, Ashby-de-la-Zouch, Leicestershire

Can you construct a rocket while defending yourself from flying aliens with continuous laser fire? That's the challenge in Ultimate's *Jet Pac*.

You move around with a booster rocket strapped on your back and collect the rocket parts from different platforms suspended in the air. Once the rocket is complete, you have to fill it up with six packs of fuel and then you can fly to the next planet. The fuel has to be dropped over the top of the rocket, which turns blue as it fills up. Each planet is harder than the previous one. The sound effects are strident and lively, the movement swift and smooth.

It is confusing at first, but once you get the hang of it you move faster and are able to progress.

Dave Watterson

Space Maths

Program *Space Professor* **Micro** Spectrum **Price** £5.95 **Supplier** Front Runner, K-Soft Distribution, 620 Western Avenue, London W3

Space Invaders get educational! Mathematical monstrosities (ie, wrong answers) fall from space towards a sum, with only a laser base and your mental arithmetic to zap them.

Computers are often accused of distracting children from their studies, so a program combining education and alien-blasting *should* please parents and off-spring alike. But will maths become fun when the reward is saving the world rather than a gold star?

In its favour *Space Professor* offers a wide range of difficulty (252/84? Quick!) Its menu, using icons, is extremely clear.

But chrome is mere flash when the game below is dull. Work out the solution, shoot the wrong answers and let the right one land.

There is also not enough time to read the problems before the aliens appear, making *Space Professor* too difficult for the youngsters who may benefit from it.

Sadly the ultimate incentive is not to practise maths but to *Load* a game with more variety.

John Minson

Hilarious

Program *Lingo* **Price** £9.95 **Micro** BBC B **Supplier** Complete Microcomputer Services Ltd., 32-38 Osnaburgh Street London NW1 3ND

This program, based on an idea by Alan Wakeman, is intended to teach sentence construction. It is built into a fun game which can be played on your own or with up to four players

The program has 700 words and it chooses 12 at random which you then have to construct into a sentence with the help of a pool of common words and terminations: the cement that binds words into sentences like 'the', 'ly' and 'with'

The game is easy to use, well explained and with simple controls. Your score takes into account how many of the 12 words you use (with a bonus if you involve them all) and how many of the pool words you use. The micro has to take your word for it that the sentence is correctly constructed so its value as an unsupervised educational aid is very limited. You may set a time-limit if you choose

The final story when read out may be grammatically correct but its absurdity is usually hilarious. That's what makes *Lingo* fun to play

Jan Watterson

Slow

Program *Supabasic* **Micro** Commodore 64 **Price** £9.99 (cassette or disc) **Supplier** Interceptor, Lindon House, The Green, Tadley, Hants

Commodore's decision to equip the 64 with a rather primitive version of Basic has led to the appearance of a large number of Basic extension programs.

One of the latest is *Supabasic* from Interceptor. This gives you a further 72 Basic keywords covering the usual range of additional commands for graphics, sound, sprites and programming aids.

Unfortunately, no structured Basic keywords are included.

Although the new commands do include a number of handy additions there are a number of notable omissions. For example, there are various commands for manipulating a hi-res display including some nice features like a *Window* command to display a text window at the bottom of the hi-res screen. However, only standard hi-res mode can be used, not multi-colour, and a number of other popular commands like *Circle* and *Fill* are missing

Similarly, programming aids like *Old* and *Renumber* are provided, but no *Auto* and *Delete* which are at least as useful. On the other hand, the facilities provided for the handling of sprites and user-defined characters are quite complete and easy to use

The biggest drawback of *Supabasic* is its execution speed, or rather lack of it. Although many commands execute at roughly normal speed, both numeric and string expressions are evaluated at a snail's pace — two to three times more slowly than the standard Basic

John Minson

Time Lord

Program *The Key to Time* **Micro** Spectrum **Price** £5.95 **Supplier** Lumpsoft, 17 Hardrow Road, Leeds

This is an adventure game based on the travels of a certain Time Lord, well known for travelling about in a police box. It is a text only adventure, but none the worse for that.

The Doctor has been placed under your command, and your task is to help him to find the five parts of the Key, thus, as usual, saving the universe. The game recognises a wide vocabulary fairly well — with the exception of the phrase "go to" which usually got the reply "I can't tie a rope to that!" There are numerous more or less useful objects to find, retrieve and use

This game is a good one. It promises all sorts of adventures for the budding Time Traveller, and many hours of enjoyment. There is no "Save" option — the length of the game makes this a sad omission — and no microdrive option either. These are minor problems in a well designed game, and it should do well.

Simon Springett

Bearface

Program *Castle of Gems* **Price** £5.70 **Micro** BBC B **Supplier** MRM Software, 17 Cross Coates Road, Grimsby

Bertie Bear has to eat all the gems on each screen before his rivals do. The opposing characters include spring-like Gem Gobblers, Gremlins, deadly Moving Trees, Ghosts and Witches. If he puts on the hat he becomes invisible and invincible he can kill witches and walk through his competitors.

The castle setting is like something from Escher — endless staircases with occasional lifts so that moving around can be confusing at first. When all gems have gone from one screen Bertie can progress on to the next.

There are nine on each side of the tape — each harder than the last: some are faster, some have more enemies, some have more complicated stairs and paths for Bertie to follow. Honeypots appear on some screens and give bonus points.

The controls are left, right, up and down, which you can operate from keyboard or joysticks

It is great fun to play being fast, furious and colourful. It has good sound effects and music, is easy to pick up and compulsive to play. If you can't get to an arcade to play *Crystal Castles*, it's a good second.

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Bigger and bigger

Make your screen just a bit bigger using this m/c program by ***Stuart Nicholls,*** *for the 48K Spectrum*

Spectrum owners, would you like to be able to enter the following types of line into your BASIC program.

```
10 REM SET UP SCREEN (24 lines)
20 border 4PAPER 2: INK 7PRINT CHR$ 12;
30 PRINT AT 23,0 "THIS LINE STARTS ON THE
   ACTUAL BOTTOM LINE OF THE SCREEN
   WOT NO ERROR REPORT?"
40 REM SCROLL THE SCREEN TWICE
50 PRINT CHR$ 11, CHR$ 11;
```

What's this? Printing on the *Edit* lines without the usual *Print #0; at 0,0;* "message", clearing all 24 lines and a scroll call *Print Chr$11*; with no sign of a machine code routine *Usr* call. Well, the answer is yes it is possible and what is more it is not interrupt driven, does not require the microdrive 'shadow Rom' and works on a standard 48K Spectrum. (I assume it will work with microdrives attached but have not been able to prove this)

Although the answer is of course a machine code routine, we do not need to call it in anyway as the Spectrum can be made to do this for us using a simple Basic command

The Spectrum Rom machine code routine to *Print* a character makes use of an all-purpose subroutine accessed in machine code using the well known *Rst 16d* instruction. This subroutine normally occupies Rom area *09F4h* to *0EA3h* and handles printout to the *Upper* screen, *Lower* screen and the *Printer* so is slow in comparison to a dedicated *Upper* screen *Print* routine

The word 'normally' in the above statement gives a clue to the answer. The Rom *Print* subroutine is accessed by the Rom using data in Ram! That is, whenever printing to the *Upper* screen is required *Stream 2* is selected and the address of the *Print Output* routine to be used is taken from the *Channel 'S'* data in Ram. The base address of the channel data is pointed to by the system variable *Chans 23631/2* and is normally situated after the system variables occupying the 21 bytes before the Basic program area (the fitting of a microdrive will alter this)

The *Channel 'S'* information normally occupies addresses 23739-23743 and is in the form.

23739/40 Address of *Output* routine *09F4*
23741/42 Address of *Input* routine *15C4*
23743 53h *Chr Code "S"*

So you can see that we are able to alter the output routine address to point to a user written routine, and that is exactly what has been done

I have produced a revised *Print* routine with games programers in mind, although it has its uses for more serious applications, and gives other functions

Because Keywords and the Spectrum graphics characters are seldom used in actual programs, and I wanted the new routine as short as possible to speed things up these are ignored. For a similar reason *Inverse* has been left out. Characters 32 to 127 and *Udg's* are printed, as are colour, *AT*, *TAB*, and *N/L* controls. (You are still able to use your own character generator in Ram if you wish in the normal way)

Printing is allowed on all 24 lines. For example *Print Ink 0 Paper 5 Over 1, At 23,0;* "A" is quite acceptable and will print on the bottom line.

If the line or column number exceeds the screen size then the routine will amend it to stay on the screen, providing it does not exceed 255. For example, *Print At 24,32,* "A" is the same as *Print At 0,0,* "A" This can give the effect of a wrap around screen.

If printing runs off the bottom of the screen then the screen will automatically scroll and does not give the usual 'scroll?' prompt.

Because the Basic *Cls* will only clear 22 lines (0-21) I have included a *Clear 24* lines code (also *Cls* will re-instate the Spectrum Rom routine) *Print Chr$ 12;* will clear the screen using the permanent colours and set the print position to 0,0; A semicolon must be used to supress the newline code that would be printed if we used *Print Chr$ 12*

Print Chr$ 11, will produce an *Upscroll* but leave the print position unchanged. Note again that the semicolon has been used. *Print Chr$ 11* will produce an *Upscroll* with a *Newline*

Print Tab column, is also permitted, and has the advantage over the Spectrum routine of not removing printing between the current print position and the *Tab* position

The interrupts are disabled whilst printing and scrolling

Using your favourite *Hexloader* enter the code from the *Hexdump*. The checksum byte at the end of each line is the sum of the previous 8 bytes. The start address is 64500 and the routine is 465 bytes long

Once entered then *Save* the code using *Save "name" Code* 64500,465. To switch routines you should enter a line into your Basic program before any *Print* commands as follows.

Without microdrive fitted use **10** 0,251. With microdrives fitted (but note that the routine has not been proved this way) use

```
10 Let Chans=Peek 23631+256*Peek 23632
20 Poke Chans+5,244:Poke Chans+6,251
```

This *Pokes* a new value into the output routine for channel 'S'. This new routine will now remain in operation until a *Cls* command is used or the Spectrum produces an automatic listing. This in no way affects the use of the printer and error reports or *Input* commands will overprint on the *Edit* lines using *Bordercolours.*

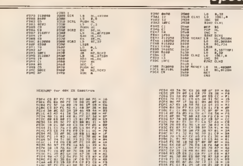
Using all this information, you will see that it becomes very easy to move characters over all the screen and so improve your games programs. I have included my Assembly listing (using the *Picturesque* assembler) should you wish to try out your ideas.

```
            0001 ;          "**********************"
            0002 ;          "*                    *"
            0003 ;          "* NEW PRINT ROUTINE  *"
            0004 ;          "*        by          *"
            0005 ;          "*  Stuart Nicholls   *"
            0006 ;          "*                    *"
            0007 ;          "**********************"
            0008 ;
            0009 ;          "SCREEN FORMAT"
            0010 ;          "TOP LH=Line 24/Col.33"
            0011 ;          "BOT RH=Line  1/Col  2"
            0012 ;          "B register holds Line"
            0013 ;          "C register holds Col."
            0014 ;          "HL holds SCREEN ADDR."
            0015 ;
            0016 ;
FBF4        0019       ORG   64500
5C8E        0020 TVDATA EQU  23566
5C51        0030 CURCH  EQU  23633
2211        0040 TEMPS  EQU  2211H
5C88        0050 SPOSN  EQU  23688
5C84        0060 DFCC   EQU  23684

5C3B        0070 FLAGS  EQU  23611
5C36        0080 CHARS  EQU  23606
5C91        0090 PFLAG  EQU  23697
5C7B        0095 UDG    EQU  23675
5C8F        0090 ATTRT  EQU  23695
5C8D        0094 ATTRP  EQU  23693
            0095 ;
            0096 ;          "ENTER with the CHR"
            0097 ;          "CODE in the A reg."
            0098 ;
FBF4 CD97FC 0100 PRINT CALL  FPOSN
FBF7 FE20   0110       CP    32
FBF9 D2AAFC 0120       JP    NC,PNT1T
FBFC FE08   0130       CP    8
FBFE D8     0140       RET   C
FBFF FE18   0150       CP    24
FC01 D0     0160       RET   NC
FC02 210EFC 0170       LD    HL,C6-6
FC05 5F     0180       LD    E,A
FC06 1600   0190       LD    D,0
FC08 19     0200       ADD   HL,DE
FC09 5E     0210       LD    E,(HL)
```

Spectrum

```
FC0A 19              ADD  HL,DE
FC0B E5              PUSH HL
FC0C C3B7FC          JP   FPOSN
               ;
FC0F 42        C6    DEFB 46
FC10 41        C7    DEFB 45
FC11 40        C8    DEFB 44
FC12 3F        C9    DEFB 43
FC13 3E        C10   DEFB 42
FC14 3D        C11   DEFB 50
FC15 0C        C12   DEFB 12
FC16 2D        C13   DEFB 45
FC17 3A        C14   DEFB 58
FC18 39        C15   DEFB 57
FC19 46        C16   DEFB 70
FC1A 45        C17   DEFB 69
FC1B 44        C18   DEFB 68
FC1C 43        C19   DEFB 67
FC1D 42        C20   DEFB 66
FC1E 41        C21   DEFB 65
FC1F 3B        C22   DEFB 59
FC20 3A        C23   DEFB 58
               ;
FC21 F3        CLS   DI
FC22 210040          LD   HL,16384
FC25 110140          LD   DE,16385
FC28 01FF17          LD   BC,6143
FC2B 3600            LD   (HL),0
FC2D EDB0            LDIR
FC2F 23              INC  HL
FC30 13              INC  DE
FC31 01FF02          LD   BC,767
FC34 3A8D5C          LD   A,(ATTRP)
FC37 77              LD   (HL),A
FC38 EDB0            LDIR
FC3A 012118          LD   BC,1821H
FC3D 210040          LD   HL,16384
FC40 C354FD          JP   SETCL
               ;
FC43 0E21      NEWLN LD   C,33
FC45 CD76FD          CALL SCRLL
FC48 05              DEC  B
FC49 C354FD          JP   SETCL
               ;
FC4C F3        UPSCR DI
FC4D CD76FD          CALL SCR
FC50 FB              EI
FC51 C9        NOPNT RET
               ;
FC52 116CFC    TV2   LD   DE,CONT
FC55 320F5C          LD   (TVDATA+1),A
FC58 1809            JR   CHNGE
               ;
FC5A 1152FC    TABAT LD   DE,TV2
FC5D 1803            JR   TV1
               ;
FC5F 116CFC    INPRN LD   DE,CONT
               ;
FC62 320E5C    TV1   LD   (TVDATA),A
               ;
FC65 2A515C    CHNGE LD   HL,(CURCHL)
FC68 73              LD   (HL),E
FC69 23              INC  HL
FC6A 72              LD   (HL),D
FC6B C9              RET
               ;
FC6C 11F4F8    CONT  LD   DE,PRINT
FC6F CD65FC          CALL CHNGE
FC72 2A0E5C          LD   HL,(TVDATA)
FC75 57              LD   D,A
FC76 7D              LD   A,L
FC77 FE16            CP   22
               ;                "EXIT via ROM routine"
               ;                "for colour codes"
FC79 DA1122          JP   C,TEMPS
FC7C 201D            JR   NZ,TAB
               ;
FC7E 7A        AT    LD   A,D
FC7F E61F            AND  31
FC81 4F              LD   C,A
FC82 3E1F            LD   A,31
FC84 91              SUB  C
FC85 C602            ADD  2
FC87 4F              LD   C,A
FC88 7C              LD   A,H
FC89 D618      AT1   SUB  24
FC8B 30FC            JR   NC,AT1
FC8D 2802            JR   Z,AT2
FC8F C618            ADD  24
FC91 47        AT2   LD   B,A
FC92 3E18            LD   A,24
FC94 90              SUB  B
FC95 47              LD   B,A
FC96 C354FD          JP   SETCL
               ;
FC99 7C        TAB   LD   A,H
FC9A CDB7FC          CALL FPOSN
FC9D 81              ADD  C
FC9E 3D              DEC  A
FC9F E61F            AND  31
FCA1 C8              RET  Z
FCA2 57              LD   D,A
               ;
FCA3 CD40FD    SPACE CALL PRPC
FCA6 15              DEC  D
FCA7 20FA            JR   NZ,SPACE
FCA9 C9              RET
               ;
FCAA F3        PRTIT DI
FCAB CDBFFC          CALL PTALL
               ;
FCAE ED43885C  STORE LD   (SPOSN),BC
FCB2 22845C          LD   (DFCC),HL
FCB5 FB              EI
FCB6 C9              RET
               ;
FCB7 ED4B885C  FPOSN LD   BC,(SPOSN)
FCBB 2A845C          LD   HL,(DFCC)
FCBE C9              RET
               ;
FCBF FE80      PTALL CP   128
FCC1 380F            JR   C,CHRP
FCC3 FE90            CP   144
FCC5 D0              RET  NC
FCC6 D6A5      CHUDG SUB  165
FCC8 D0              RET  NC
FCC9 C615            ADD  21
FCCB C5              PUSH BC
FCCC ED4B7B5C        LD   BC,(UDG)
FCD0 1805            JR   CHAR1
               ;
FCD2 C5        CHRP  PUSH BC
FCD3 ED4B365C        LD   BC,(CHARS)
               ;
FCD7 EB        CHAR1 EX   DE,HL
FCD8 2600      CHAR2 LD   H,0
FCDA 6F              LD   L,A
FCDB 29              ADD  HL,HL
FCDC 29              ADD  HL,HL
FCDD 29              ADD  HL,HL
FCDE 09              ADD  HL,BC
FCDF C1              POP  BC
FCE0 EB              EX   DE,HL
FCE1 79        ALL   LD   A,C
FCE2 3D              DEC  A
FCE3 3E21            LD   A,33
FCE5 2003            JR   NZ,ALL1
FCE7 05              DEC  B
FCE8 4F              LD   C,A
FCE9 B9        ALL1  CP   C
FCEA D5              PUSH DE
FCEB CC76FD          CALL Z,SCRLL
FCEE D1              POP  DE
FCEF C5              PUSH BC
FCF0 E5              PUSH HL
               ;                "Consider OVER"
               ;                "but NOT INVERSE"
FCF1 3A915C          LD   A,(PFLAG)
FCF4 06FF            LD   B,255
FCF6 1F              RRA
FCF7 3801            JR   C,ALL2
FCF9 04              INC  B
FCFA 0E08      ALL2  LD   C,8
FCFC A7              AND  A
FCFD EB              EX   DE,HL
FCFE 1A        ALL3  LD   A,(DE)
FCFF A0              AND  B
FD00 AE              XOR  (HL)
FD01 12              LD   (DE),A
FD02 14              INC  D
FD03 23              INC  HL
FD04 0D              DEC  C
FD05 20F7            JR   NZ,ALL3
FD07 EB              EX   DE,HL
FD08 25              DEC  H
FD09 CD11FD          CALL ATTR
FD0C E1              POP  HL
FD0D C1              POP  BC
FD0E 0D              DEC  C
FD0F 23              INC  HL
FD10 C9              RET
               ;
FD11 7C        ATTR  LD   A,H
FD12 0F              RRCA
FD13 0F              RRCA
FD14 0F              RRCA
FD15 E603            AND  3
FD17 F658            OR   88
FD19 67              LD   H,A
FD1A ED5B8F5C        LD   DE,(ATTRT)
FD1E 7E              LD   A,(HL)
FD1F AB              XOR  E
FD20 A2              AND  D
FD21 AB              XOR  E
FD22 FDCB5776        BIT  6,(IY+87)
FD26 2808            JR   Z,ATTR1
FD28 E6C7            AND  199
FD2A CB57            BIT  2,A
FD2C 2002            JR   NZ,ATTR1
FD2E EE38            XOR  56
FD30 FDCB5766  ATTR1 BIT  4,(IY+87)
FD34 2808            JR   Z,ATTR2
FD36 E6F8            AND  248
FD38 CB6F            BIT  5,A
FD3A 2002            JR   NZ,ATTR2
FD3C EE07            XOR  7
FD3E 77        ATTR2 LD   (HL),A
FD3F C9              RET
               ;
FD40 D5        PRPC  PUSH DE
FD41 D9              EXX
FD42 3A915C          LD   A,(PFLAG)
FD45 F5              PUSH AF
FD46 3E20            LD   A,32
FD48 FD365701        LD   (IY+87),1
FD4C D7              RST  16
FD4D F1              POP  AF
FD4E 32915C          LD   (PFLAG),A
FD51 D9              EXX
FD52 D1              POP  DE
FD53 C9              RET
               ;                "Find SCREEN POS."
               ;                "from Line,Col."
FD54 78        SETCL LD   A,B
FD55 C5              PUSH BC
FD56 47              LD   B,A
FD57 CD65FD          CALL ADDR
FD5A C1              POP  BC
FD5B 3E21            LD   A,33
FD5D 91              SUB  C
FD5E 5F              LD   E,A
FD5F 1600            LD   D,0
FD61 19              ADD  HL,DE
FD62 C3AEFC          JP   STORE
               ;
FD65 3E18      ADDR  LD   A,24
FD67 90              SUB  B
FD68 57              LD   D,A
FD69 0F              RRCA
FD6A 0F              RRCA
FD6B 0F              RRCA
FD6C E6E0            AND  224
FD6E 6F              LD   L,A
FD6F 7A              LD   A,D
FD70 E618            AND  24
FD72 F640            OR   64
FD74 67              LD   H,A
FD75 C9              RET
               ;
FD76 1154FD    SCRLL LD   DE,SETCL
FD79 D5              PUSH DE
FD7A 78              LD   A,B
FD7B A7              AND  A
FD7C C0              RET  NZ
```



```
FD7D 212040    2285 ;
               2290 SCR    LD   HL,4020H
FD80 0400      2300        LD   B,8
FD82 E5        2310 SCR1   PUSH HL
FD83 0E03      2320        LD   C,3
FD85 C5        2330        PUSH BC
FD86 EB        2340 SCR2   EX   DE,HL
FD87 2100FF    2350        LD   HL,0FFE0H
FD8A 19        2360        ADD  HL,DE
FD8B EB        2370        EX   DE,HL
FD8C 012000    2380 SCR3   LD   BC,32
FD8F EDB0      2390        LDIR
FD91 7D        2400        LD   A,L
FD92 A7        2410        AND  A
FD93 20F1      2420        JR   NZ,SCR2
FD95 212007    2430        LD   HL,0720H
FD98 19        2440        ADD  HL,DE
FD99 C1        2450        POP  BC
FD9A 0D        2460        DEC  C
FD9B C5        2470        PUSH BC
FD9C 20EE      2480        JR   NZ,SCR3
FD9E AF        2490        XOR  A
FD9F 0620      2500        LD   B,32
FDA1 12        2510 CLN1   LD   (DE),A
FDA2 13        2520        INC  DE
FDA3 10FC      2530        DJNZ CLN1
FDA5 C1        2540        POP  BC
FDA6 E1        2550        POP  HL
FDA7 24        2560        INC  H
FDA8 10D8      2570        DJNZ SCR1
FDAA 212058    2580 VCRAT  LD   HL,5820H
FDAD 110058    2590        LD   DE,5800H
FDB0 01E002    2600        LD   BC,736
FDB3 EDB0      2610        LDIR
FDB5 3A085C    2620        LD   A,(ATTRP)
FDB8 0620      2630        LD   B,32
FDBA 12        2640 CLN2   LD   (DE),A
FDBB 13        2650        INC  DE
FDBC 10FC      2660        DJNZ CLN2
               2665 ;
FDBE 212040    2670 RESET  LD   HL,4020H
FDC1 012101    2680        LD   BC,0121H
FDC4 C9        2690        RET
               2700        END
```

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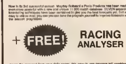
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FLY DARK STAR



IN THE DARK

The plot thickens

Explore your artistic talents with Scribble written for the Amstrad by ***Brian*** *and* ***David Lewis***

This program allows you to draw on the screen, either with a joystick, or by using the cursor controls. It shows you, amongst other things, the difference between mode 0 (20 column screen), mode 1 (40 columns) and mode 2 (80 columns) plus the maximum number of colours for each mode.

Modes can be toggled from the Enter key, with the mode number printed to the screen. The fire button (or copy key) prints out each colour (in that colour), whilst the screen can be cleared with the space bar.

Each mode change or screen refresh starts the cursor at 0,0 (ie, at the bottom left hand side of the screen).

The flashing cursor lets you know where you are on the screen, which is particularly helpful when drawing in background colour.

Program Notes

Line 100	— initialisation
Line 110-140	— adjusts x and y co-ordinates
Line 150	— flashes cursor
Line 160-190	— changes pen colour
Line 200	— plots x and y
Line 210-220	— if space bar or enter, Gosub 300
Line 310-360	— adjusts mode and associated parameters
Line 370	— restores x and y to 0 0
Line 380	— clears keyboard buffer
Line 400	— sets up variables
Line 410-470	— prints title page and instructions
Line 480-490	— configures for cursor or joystick control

Variables

cursor	= value for on-screen cursor (either 0 or 1)
maxcolour	= Maximum no. of pens in that mode
s$	= value of key pressed
s	= ASCII value of s$
m	= screen mode
jump	= x co-ordinate for scaling screen to fit mode
colour	= pen chosen
off	= used with inkey to detect key release
fire	= keycode for fire button
copy	= keycode for copy key
space	= ASCII value of space bar
enter	= ASCII value of enter key

Lines 110 to 230 comprise the main loop of the program. 300 to 390 clear screen and change mode. Lines 399 to 600 are the initialisation subroutine.

```
99     REM  Amstrad scribble              16/7/84           B. & D. Lewis
100 GOSUB 400:GOSUB 310:GOTO 120
110 IF INKEY(up)=pressed THEN y=y+2:GOTO 120
120 IF INKEY(down)=pressed THEN y=y-2
130 IF INKEY(left)=pressed THEN x=x-jump:GOTO 150
140 IF INKEY(right)=pressed THEN x=x+jump
150 cursor=1-cursor:PLOT x,y,cursor
160 IF INKEY(changecolour)=off THEN 200
170 colour=colour+1:IF colour>maxcolour THEN colour=0
180 PEN colour:LOCATE 30,1:PRINT"Colour=",COLOUR
190 IF INKEY(changecolour)=pressed THEN 190
200 PLOT x,y,colour
210 s$=INKEY$:IF s$="" THEN 110
220 s=ASC(s$):IF (s=space OR s=enter) THEN GOSUB 300:GOTO 180
230 GOTO 110
240    END
299    REM  SCREEN CLEAR & MODE CHANGE SUBROUTINE
300 IF s$=" " THEN CLS:GOTO 360
310 m=m+1:IF m=3 THEN m=0
320 MODE m
330 IF m=0 THEN maxcolour=15:jump=4
340 IF m=1 THEN maxcolour=3:jump=2
350 IF m=2 THEN maxcolour=1:jump=1
360 PEN 1:PRINT"Mode";m
370 x=0:y=0:colour=1
380 WHILE s$<>"":s$=INKEY$:WEND
390    RETURN
399    REM  INITIALISATION SUBROUTINE
400 colour=1:off=-1:pressed=0:fire=76:copy=9:space=32:enter=13
410 MODE 0
420 PEN 1:LOCATE 7,1:PRINT"Amstrad":PRINT" Scribble Program"
430 PEN 2:LOCATE 1,6:PRINT"Press":PRINT:PRINT"Or"
440 PEN 15:LOCATE 7,6:PRINT"FIRE BUTTON":LOCATE 4,8:PRINT"COPY KEY"
450 PEN 4:LOCATE 1,11:PRINT"Use cursor keys or joystick to draw lines. Backg
round is always PEN 0  i.e.  NO COLOUR MESSAGE"
460 PEN 9:PRINT:PRINT"SPACE BAR - CLEARS                 SCREEN":PRINT:PRINT"ENTER
KEY - CHANGES              MODE"
470 PEN 5:LOCATE 4,24:PRINT"By D & B Lewis"
480 IF (INKEY(fire)=off AND INKEY(copy)=off) THEN 480
490 IF INKEY(fire)=pressed THEN changecolour=76:up=72:down=73:left=74:right=75
    ELSE changecolour=9:up=0:down=2:left=8:right=1
500    RETURN
```

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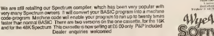
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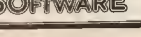
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Starry, starry night

A program of immense magnitude for the Electron
by ***John Beckett***

Observation of the night sky will reveal that the stars are of unequal brightness. This brightness, or magnitude, of a star depends on its distance away and its luminosity. The system of magnitudes is related to a precise logarithmic scale. Each magnitude differs from the next one by a factor of 2.512, therefore a first magnitude star is 2.512 times brighter than a second magnitude star.

The brightest star in the sky, Sirius is magnitude −1.4. Care must always be taken to note the difference between a star's apparent magnitude as we see it at its true distance from Earth, and its absolute magnitude as the star would appear at a distance of 10 parsecs from us. (A parsec being a unit of stellar distance corresponding to 3.26 light-years.)

For instance suppose you observe Sirius, you will find that its apparent magnitude is −1.4. By calculation, we find that its absolute magnitude is 1.4. Therefore, if Sirius was say 40 times its distance from Earth, it would not be the brightest star as its apparent magnitude would have changed, although its absolute magnitude will stay the same. This makes the calculation of the absolute magnitude very important in astronomy.

The program consists of three main procedures.

ProcIntro is a simple text introduction of the concept of absolute magnitude.

ProcDataEntry asks for the distance of the star from the Earth (either in light-years or parsecs), the name of the star, and its apparent magnitude, assigning each its own variable.

Finally, *ProcCalculate* works out, then prints the absolute magnitude, using the equation in Line 370.

So, the program will work out the absolute magnitude of any star, as long as the distance (in light-years or parsecs) and the apparent magnitude from Earth is known.

```
10REM Absolute Magnitude/Electron
20REM John T W Beckett 1984
30ON ERROR REPORT:PRINT" at line "ERL:END
40MODE6:VDU19,0,4;0;
50PROC_INTRO
60PROC_DATA_ENTRY
70PROC_CALCULATE
80INPUT'"Do you wish to run this program again"YN$
90IF LEFT$(YN$,1)<>"N" AND LEFT$(YN$,1)<>"Y"VDU7:GOTO80
100IF LEFT$(YN$,1)="Y" THEN 40
110IF LEFT$(YN$,1)="N" THEN END
120DEFPROC_DATA_ENTRY:CLS
130INPUT "Enter stars name "SN$
140IF LEN(SN$)>40 VDU7:GOTO130
150INPUT'"Enter stars distance "SD
160IF SD<1 VDU7:GOTO150
170PRINT'"Enter unit of distance"'"L=LIGHT-YEAR    P=PARSEC"
180INPUT U$
190IF LEFT$(U$,1)<>"L" AND LEFT$(U$,1)<>"P" THEN VDU7:GOTO180
200IF LEFT$(U$,1)="L" SD=SD*0.3068
210INPUT'"Enter apparent magnitude "AP
220IF AP>1000 VDU7:GOTO210
230ENDPROC
240DEFPROC_INTRO
250PRINT'"   CALCULATION OF ABSOLUTE MAGNITUDE"
260PRINT''"The absolute magnitude of a star is the"
270PRINT'"magnitude which a star would have if"
280PRINT'"put at a distance of 32.6 light-years"
290PRINT'"or 10 parsecs from us.  It is a measure"
300PRINT''of the real brightness of a star."
310PROC_SPACE:ENDPROC
320DEFPROC_SPACE
330PRINTTAB(4,23)"Press 'SPACE BAR' to continue";
340REPEATUNTILGET=32:ENDPROC
350DEFPROC_CALCULATE
360@%=&2040A
370AM=AP+5-5*LOG(SD)
380CLS:PRINT''"THE ABSOLUTE MAGNITUDE OF "SN$
390PRINT'"IS "AM:ENDPROC
```

BEWARE. THE CYCLONE.

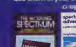


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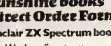
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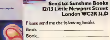
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The inner depths

Keith Poole concludes his QL Disassembler, the program that reaches parts other programs miss

The QL Disassembler is a program which will show you the inner depths of your QL's memory. The first part of the listing was printed last week, the remainder follows below.

Program Notes

The main loop in the program consists of a select statement, which calls the procedure associated with each instruction group.

The procedures *Group 0* to *Group n* decode each group of instructions as defined last week. *Group m* handles move instructions. *User* deals with the two user definable instructions (*Group a* and *f*) by printing udef. It assumes that these instructions take up a minimum 2 byte op code.

The two functions *Addr$* and *Raddr$* decode the addressing mode of the instruction using two arguments *reg* and *mde*. Some instructions only use a subset of these addressing modes, so *raddr$* checks for these before calling *addr$*.

Dec takes a hexadecimal string argument and returns the decimal equivalent. To use this function, remember to initialise a variable digits with the value *0123456789ABCDEF*. The function can handle upper or lower case letters.

Hex$ performs the opposite to *Dec*. It takes a numeric argument and returns a hexadecimal string.

Slice takes a bit slice from a number supplied, (eg, slice (240,2,3) returns a three bit number starting at bit two.

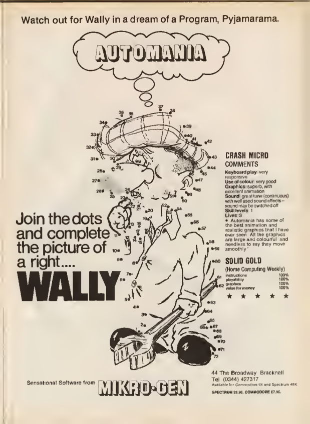
Group 4 contains the miscellaneous instructions and so is the most complex of the procedures. To simplify it, two subgroups *Sub8* and *Sub14* were given their own procedures.

```
2790 IF slice(rest,6,2)=3 THEN
2800    IF bot MOD 2 1 THEN
2810       op$="muls"
2820    ELSE
2830       op$="mulu"
2840    END IF
2850    op$=op$&"  "&addr$(slice(rest,3,3),slice(rest,0,3))&",d"&(bot DIV 2)
2860 ELSE
2870  IF rest DIV 8=0 AND bot MOD 2=1 THEN
2880     op$="abcd  d"&(rest MOD 8)&",d"&(bot DIV 2)
2890  ELSE
2900    x=4*(bot MOD 2)+slice(rest,3,5)
2910    SELect ON x
2920 ON x=4:op$="exg  d"&(rest MOD 8)&",d"&(bot DIV 2)
2930 ON x=41:op$="exg  a"&(rest MOD 8)&",a"&(bot DIV 2)
2940 ON x=49:op$="exg  d"&(rest MOD 8)&",a"&(bot DIV 2)
2950 ON x=REMAINDER :op$="and"&type$(slice(rest,6,2))
2960    IF bot MOD 2=1 THEN
2970       op$=op$&"  d"&(bot DIV 2)&","&addr$(slice(rest,3,3),slice(rest,0,3))
2980    ELSE
2990       op$=op$&"  "&addr$(slice(rest,3,3),slice(rest,0,3))&",d"&(bot DIV 2)
3000    END IF
3010    END SELect
3020 END IF
3030 END IF
3040 END DEFine
3050 DEFine PROCedure groupd
3060 IF (bot MOD 2=1) AND (slice(rest,3,3)=1) THEN
3070    op$="addx"&type$(rest DIV 64)&"  d"&(rest MOD 8)&",d"&(bot DIV 2)
3080 ELSE
3090    IF (rest DIV 64)=3 THEN
3100       IF (bot MOD 2)=0 THEN
3110          op$="adda.w"
3120       ELSE
3130          op$="adda.l":lgt=1
3140       END IF
3150       op$=op$&"  "&addr$(slice(rest,3,3),slice(rest,0,3))&",a"&(bot DIV 2)
3160    ELSE
3170     IF type$(rest DIV 64)=".l" THEN lgt=1
3180       IF (bot MOD 2)=0 THEN
3190          op$=addr$(slice(rest,3,3),slice(rest,0,3))&",d"&(bot DIV 2)
3200       ELSE
3210          op$="d"&(bot DIV 2)&","&addr$(slice(rest,3,3),slice(rest,0,3))
3220       END IF
3230       op$="add"&type$(rest DIV 64)&"  "&op$
3240    END IF
3250 END IF
3260 END DEFine
3270 DEFine PROCedure groupe
3280 IF slice(rest,6,2)=3 THEN
3290    op$=addr$(slice(rest,3,3),slice(rest,0,3))
3300    SELect ON bot
3310       ON bot=0:op$="asr  "&op$
3320       ON bot=1:op$="asl  "&op$
3330       ON bot=2:op$="lsr  "&op$
3340       ON bot=3:op$="lsl  "&op$
3350       ON bot=4:op$="roxr  "&op$
3360       ON bot=5:op$="roxl  "&op$
3370       ON bot=6:op$="ror  "&op$
3380       ON bot=7:op$="rol  "&op$
3390    END SELect
3400 ELSE
3410  IF slice(rest,5,1)=1 THEN
3420     op$=type$(slice(rest,6,2))&"  d"&(bot DIV 2)&",d"&(rest MOD 8)
3430  ELSE
3440    p=(bot DIV 2):IF p=0 THEN p=8
3450     op$=type$(slice(rest,6,2))&"  #"&p&",d"&(rest MOD 8)
3460 END IF
3470    x=slice(rest,3,2)*2+(bot MOD 2)
3480   SELect ON x
3490   ON x=0:op$="asr"&op$
3500   ON x=1:op$="asl"&op$
3510   ON x=2:op$="lsr"&op$
3520   ON x=3:op$="lsl"&op$
3530   ON x=4:op$="roxr"&op$
3540   ON x=5:op$="roxl"&op$
3550   ON x=6:op$="ror"&op$
3560   ON x=7:op$="rol"&op$
3570 END SELect
3580 END IF
3590 END DEFine
3600 DEFine FuNction slice(dta,bit,LEN)
3610 RETurn (dta DIV 2^bit) MOD 2^LEN
3620 END DEFine
3630 DEFine FuNction raddr$(mde,reg)
3640 IF mde=7 AND (reg=0 OR reg=1) THEN
3650    RETurn "error"
3660 ELSE
3670    RETurn addr$(mde,reg)
3680 END IF
3690 END DEFine
3700 DEFine FuNction addr$(mde,reg)
3710 LOCal temp
3720 SELect ON mde
3730 ON mde=1:RETurn "a"&reg
3740 ON mde=0:RETurn "d"&reg
3750 ON mde=2:RETurn "(a"&reg&")"
3760 ON mde=3:RETurn "(a"&reg&")+"
3770 ON mde=4:RETurn "-(a"&reg&")"
3780 ON mde=5
3790    temp=PEEK_W(s+op):op=op+2
3800    RETurn hex$(temp)&"(a"&reg&")"
3810 ON mde=6
3820    RETurn eiwx$(reg)
3830 ON mde=7
3850    IF reg=0 THEN op=op+2:p=PEEK_W(s+op-2):RETurn hex$(p)
3860    IF reg=1THEN op=op+4:p=PEEK_L(s+op-4):RETurn
```

Continued over the page

```
hex$(p)
3870     IF reg=2 THEN op=op+2:p=256*PEEK(s+op-2)+PEEK
(s+op-1):RETurn hex$(p)& (p
c)"&" &hex$(PEEK_W(s+op-2)+s+op)
3880     IF reg=3 THEN RETurn etwx$(8)
3890     IF reg=4 THEN RETurn "£"&hex$(peeker)
3910 ON ad=REMAINDER tagh=1:RETurn "error"
3920 END SELect
3930 RETurn "error":tagh=1
3940 END DEFine
3950 DEFine FuNction eiwx$(reg)
3960 LOCal n1,n2,reg$
3970 n1=PEEK(s+op):n2=PEEK(s+op+1):op=op+2
3980 IF n1>127 THEN
3990    reg$="a"
4000 ELSE
4010    reg$="d"
4020 END IF
4030 reg$=reg$&slice(n1,4,3)
4040 IF slice(n1,4,1)=1 THEN
4050    reg$=reg$&".l"
4060 ELSE
4070   reg$=reg$&".w"
4080 END IF
4090 IF reg=8 THEN
4100    RETurn hex$(n2)&"("&reg$&",pc)"
4110 ELSE
4120   RETurn hex$(n2)&"(a"&reg$&","&reg$&")"
4130 END IF
4140 END DEFine
4150 DEFine FuNction peeker
4160 IF lgt=1 THEN
4170 op=op+4:RETurn PEEK_L(s+op-4)
4180 ELSE
4190 op=op+2:RETurn 256*PEEK(s+op-2)+PEEK(s+op-1)
4200 END IF
4210 END DEFine
4220 DEFine FuNction type$(n)
4230 SELect ON n
4240 ON n=0:RETurn ".b"
4250 ON n=1:RETurn ".w"
4260 ON n=2:RETurn ".l":lgt=1
4270 ON n=REMAINDER :RETurn "error":tagh=1
4280 END DEFine
4290 DEFine PROCedure setup
4300 FOR i=0 TO 15:READ cc$(i)
4310 DATA "ra","sr","hi","ls","cc","cs","ne","eq","vc",
"vs","pl","mi","ge","lt","gt","le"
4320 END DEFine
4330 DEFine PROCedure sub8
4340 IF (rest DIV 128)=1 THEN
4350   IF slice(rest,3,3)=0 THEN
4360      IF slice(rest,6,1)=0 THEN
4370         op$="ext.w "
4380      ELSE
4390         op$="ext.l "
4400      END IF
4410      op$=op$&" d"&(rest MOD 8)
4420  ELSE
4430    IF (bol MOD 2)=1 THEN
4440      op$="movem.l ":lng=1
4450    ELSE
4460      op$="movem.w "
4470   END IF
4480  a=PEEK(s+op):d=PEEK(s+op+1):op=op+2
4490   op$=op$&addr$(slice(rest,3,3),slice(rest,0,3))
4500   IF slice(rest,3,3)=4 THEN
4510      xx=a:a=d:d=xx
4520      ot$=""
4530      FOR i=0 TO 7
4540      IF a/2<>a DIV 2 THEN ot$=ot$&"_a"&(7-i)
4550      IF d/2<>d DIV 2 THEN op$=op$&"_d"&(7-i)
4560      d=d DIV 2:a=a DIV 2
4570      END FOR i
4580      op$=op$&ot$
4590   ELSE
4600      ot$=""
4610      FOR i=0 TO 7
4620      IF a/2<>a DIV 2 THEN ot$=ot$&"_a"&i
4630      IF d/2<>d DIV 2 THEN op$=op$&"_d"&i
4640      d=d DIV 2:a=a DIV 2
4650      END FOR i
4660      op$=op$&ot$
4670   END IF
4680  END IF
4690 ELSE
4700   IF (rest DIV 64)=1 THEN
4710      op$="nbcd "&addr$(slice(rest,3,3),slice
(rest,0,3))
4720   ELSE
4730      IF slice(rest,3,3)=0 THEN
4740         op$="swap d"&slice(rest,0,3)
4750      ELSE
4760         op$="pea "&addr$(slice(rest,3,3),slice
(rest,0,3))
4770      END IF
4780   END IF
4790 END IF
4800 END DEFine
4810 DEFine PROCedure sub14
4820 x=slice(rest,6,2)
4830 SELect ON x
4840 ON x=3 op$="jmp "&addr$(slice(rest,3,3),slice
(rest,0,3))
4850 ON x=2:op$="jsr "&addr$(slice(rest,3,3),
slice(rest,0,3))
4860 ON x=1
4870   IF slice(rest,4,2)=3 THEN
4880      IF slice(rest,3,1)=1 THEN
4890        IF slice(rest,4,4)= THEN
4900           op$="trap £"&(rest MOD 16)
4910        ELSE
4920           op$="link a"&(slice(rest,0,3))&",£"&PEEK
_W(s+op):op=op+2
4930        END IF
4940      ELSE
4950         op$="unlk a"&slice(rest,0,2)
4960      END IF
4970   ELSE
4980   yy=slice(rest,0,4)
4990   SELect ON yy
5000   ON yy=0
5010         op$="reset"
5020   ON yy=1:op$="nop"
5030   ON yy=2:op$="stop £"&hex$(PEEK_W(s+op)):
op=op+2
5040   ON yy=5:op$="rte"
5050   ON yy=5:op$="rts"
5060   ON yy=6:op$="trapv"
5070   ON yy=7:op$="rtr"
5080 END SELect
5090    END IF
5100 END SELect
5110 END DEFine
5120 DEFine PROCedure sub4
5130 IF slice(rest,6,1)=1 THEN
5140    op$="chk "&"slgt"
5150 ELSE
5160    op$="movem.w"
5170 END IF
5180 a=PEEK(s+op):d=PEEK(s+op+1):op=op+2
5190 op$=op$&addr$(slice(rest,3,3),slice(rest,0,3))&",
5200 ot$=""
5210 FOR i=0 TO
5220  IF a/2<>a DIV 2 THEN ot$=ot$&"a"&i
5230  IF d/2<>d DIV 2 THEN op$=op$&"d"&i
5240  a=a DIV 2:d=d DIV 2
5250 END FOR i
5260 END DEFine
5270 DEFine PROCedure dly
5280 CLS £1:PAPER £1,3:PRINT £1,"press any key to cont
inue":PAPER £0,0
5290 op$=INKEY$(-1)
5300 CLS £0
5310 END DEFine

5320 DEFine PROCedure
5330 INK 0
5340 IF col>10 THEN PRINT FILL$(" ",col-10);:col=10
5350 FOR i=1 TO op-1
5360 IF PEEK(s+i)<32 THEN
5370    PRINT ".";
5380 ELSE
5390    PRINT CHR$(PEEK(s+i));
5400 END IF
5410 col=col-1
5420 END FOR i
5430 INK 7
5440 END DEFine
9999 POKE_W dec("3aff2"),dec("23c0")
```


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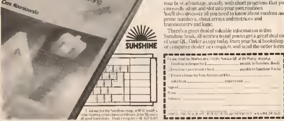
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Beneath the surface

Journey to the Land of Giants and repel borders on the CBM 64, programmed by Steve Phillips



Program Notes
C – Ship position
X – Rock X co-ordinate
Y – Rock Y co-ordinate
SC Score
BN Bonus
CL- Ship colour
G – Gap between each new position of ship

The Land of Giants is under attack from alien mini-subs. Your only defence is to hurl rocks at them, as they advance beneath the surface. Can you destroy them before your defensive wall is broken?

The program features full instructions and self-explanatory Rem statements.

```
10 GOSUB 3200 REM***INSTRUCTIONS***
20 REM***SET UP GAME***
... 
-S...5 ...
... GOSUB... GOSUB...500 ...
... 1200 GOTO 35...
... REM***MAIN LOOP***
100 GOSUB 00 GOSUB... BUTLION
200 REM***SET UP SPRITE ... ***
... POKE2041...
... FOR I=1 TO 62 READS
250 POKE832+I,S NEXT
270 POKEV+28,2 POKEV+39,1 POKEV+37,12 POKE
V+40,15 RETURN
300 REM***SET UP SPRITE 0 (SUB)***
310 POKE2040,14
320 FOR I=0 TO 62 READS
340 POKE896+I,S NEXT
350 POKEV+21 3 POKEV+30 0 POKEV+... POKE
V+1,R RETURN
400 REM***SURFACE SUB***
410 P=P-INT(G/2+I)
420 IF R<208 THEN R=208
430 POKE V+1,R RETURN
450 REM***SUBMERGE SUB***
460 FOR R=208 TO 250 STEP0.1
470 POKE V+1,R
480 NEXT POKE V,0 RETURN
500 REM***SELECT SHOT***
520 IF PEEK(197)=4 THENM=81 U=20... 17 E
=36 D=6 RETURN
530 IF PEEK(197)=5 THENM=82 O=1.2 ...6 E
=27 D=5 RETURN
540 IF PEEK(197)=6 THENM=83 U=255 ... E
=... D=4 RETURN
550 GOSUB1000 FOR T=1TO(INT(...)+10*6)
NEXT GOTO500
600 REM***PRINT SCENE***
605 PRINT"...",".........................."
610 PRINTTAB(30),"■ ■"
620 PRINTTAB(7),"***   " TAB(30) ...
■
630 PRINTTAB(5)  ...         ...TAB(...), ...■
640 PRINT"... - -   - -          - - - - - -
-■
650 PRINT"...- - - - - - - - - - - -   - -
- ■
670 PRINT"... -  -  -  -  -  -  -  -  -   -
■          ■",
680 POKE53280,5 POKE53281-6 POKE20... 160
POKE5...35,13 RETURN
700 REM***POSITION NEW ROCK***
710 U=160 X=157 Y=175 UU=0 POKEV+39 0
720 GOSUB1100 GOSUB800 RETURN
740 REM***PRINT GIANT***
750 PRINT"........................"
755 PRINT TAB(36) "|● '
760 PRINT TAB(36),' ... ■...'
765 PRINT TAB(36),'... -'
770 PRINT TAB(36),' |  '
790 RETURN
800 REM***POKE SPRITE POS ...***
820 POKEV+2 O+X-OF*256 POKEV+3 Y
840 IF(PEEK(V+30)AND5 ...)THENGOSUB... 
GOSUB1200 GOSUB2300 GOSUB2... UU=1
850 OF=0 RETURN
900 REM***MOVE ROCK***
920 GOSUB1000 IF UU=1 THEN RETURN
930 X=X-D Y=INT(... /E...)+11
940 GOSUB1100
950 IF Y>255 THEN RETURN
960 GOSUB800
970 IFUU=1 THEN RETURN
980 GOTO920
1000 REM***MOVE SUB***
1010 C=C+G
1020 IF C>170 THEN GOSUB400
1050 IF C>200 THEN GOSUB... 
1060 IF C<0 THEN RETURN
1070 POKEV C RETURN
1100 REM***CHECK IF MSB REQUIRED***
1110 IF(X+O)<256 THEN POKEV+16 0
1120 IF(X+O)>255 THEN POKEV+16,(PEEK
V+16)OR2 OF=1
1130 RETURN
1200 REM***FIRE SUBS GUN***
1210 J=0 I=0
1220 IF PEEK(1848+J)=160 THEN POKE1848+J
32 FOR T=1 TO 50 NEXT I=1
1240 IF PEEK(1808+J)=160 THEN POKE1808+J
32 POKE1848+J,160 I=1
1255 IF I=1 THEN RETURN
1260 POKE1848+J,100 POKE56120+J,8
1280 IF J=0 THEN GOSUB2400
1300 POKE1848+J,32
1310 IFO+...<017 THEN GOSUB930
1320 J=J+1 GOTO1220
1400 REM***KILL GIANT***
1410 PRINT"........................"
1420 PRINT TAB(36) '●  '
1430 PRINT TAB(...) " ... ■ "
1440 PRINT TAB(36),' ,  '
1450 PRINT TAB(36),",  "
1460 FOR T=0 TO 14
1470 POKE53281,T NEXT
1480 POKE5...281,6 POKEW 0 POKEH,0
1490 DUR=200 WF=129 NTE=5 I=J GOSUB1600
1500 POKEV+21,0 POKEW,0 POKEH 0 RETURN
1600 REM***SOUND VOICE 1***
1610 FOR U=15 TO B STEP-1
1620 IF U.200 THEN POKE ...+33,U
1... POKEH U POKEW W...
```

```
  C FUPLH,EJ FOKEH,NTE FUKEL,eE
    FUF Z=1 TO DUR NEXT
    IFO+/ 17 AND L 200 THEN GOSUB930
    NEXT RETURN
    REM+++BLOW UP SUB+++
 10 POKE + 255 UU=1
 20 DUR=, NTE=2 WF=12 B=0 GOSUB1600
    POKEW,0 POKEA 0
    GO U=1-00 RETURN
1200 REM+++FLASH SUB COLOUR+++
    FUF Z=1 TO 15
    FUR =1 TO 10 NEXT
    POKEV+39 Z NEXT
    POKE V,0 RETURN
    REM+++SCORING+++
    = +200
    PRINT"   SPC(T) SC+BN SC=SC+BN
    BN=BN+50
    GOSUB2100 RETURN
    REM+++BONUS+++
    PRINT"     SPC(32) "
    PRINT"   SPC(32 ,BN
 130 RETURN
  00 REM+++SCORE BONUS DISPLAY+++
     PRINT"______________________",
     PRINT"  SCORE= 0" SPC(17) "BONUS= 0"
   0 PRINT "_____________________",
     RETURN
  00 REM+++CHANGE SUB COLOUR+++
     CT=CT+1 HH=5+INT(CT 10)
     F=INT(HH*RND(1)
     IF F=0 THEN CL=1 G=1
  40 IF F=1 THEN CL=1 G=1.5
     IF F=2 THEN CL=3 G=2
     IF F=3 THEN CL=7 G=3
     IF F=>4ANDF 7 THEN CL=0 G=4
   0 IF F>=7 THEN CL=2 G=5
     POKE V+39,CL RETURN
 400 REM+++LAZER SOUND+++
 410 DUR=5 WF=  B=15 NTE=100
2420 GOSUB1600 RETURN
     REM+++DELAY BETWEEN SUBS+++
  20 R=225 POKEV+1 R
     P=INT(RND(1)*7)
 540 IF P>3 THEN C=7 RETURN
 550 C=-INT(F*10*G) RETURN
2600 REM+++EXPLOSION+++
 620 UU=1 GOSUB1200 BN=0 GOSUB2100
2630 IF  >11 THEN GOSUB1400 GOSUB2000
2640 DUR=120 NTE=10 WF=129 B=0 GOSUB1600
2650 POKE W,0 POKE A,0 J=0
 670 IF0+ <31ANDY<255 THEN GOSUB930
GOTO2670
2680 GOSUB460 GOSUB2300 GOSUB2500 RETURN
3000 REM+++GAME OVER+++
3010 PRINT"   "
3020 PRINT TAB(12) "GAME OVER"
3030 PRINT TAB(6) "  YOU SCORED",SC
"POINTS"
3040 PRINT TAB(6) "  PRESS ANY KEY
TO RESTART"
3050 POKE195 0 WAIT198 1 C=0 RUN30
3100 REM+++TITLE PAGE+++
3110 PRINT"  " POKE53281,13 POKE53280,5
3120 PRINT TAB(10)
3130 PRINT"  MINI-SUB CONQUEST"
3140 PRINT TAB 10),"++++++++++++++++++"
3150 PRINT"  THE LAND OF THE GIANTS IS
UNDER ATTACK"
3160 PRINT"FROM ALIEN MINI-SUBS.AS GIANT
LEADER "
3170 PRINT"YOUR ONLY DEFENCE IS TO HURL
HUGE ROCKS"
3180 PRINT"AT THE SUBS AS THEY ADVANCE
JUST BENEATH",
3190 PRINT"THE SURFACE."
3200 PRINT"YOU SCORE 200 PTS FOR EACH SUB
PLUS A"
3210 PRINT"BONUS WHICH INCREASES BY 50 PTS
FOR EACHHIT."
3220 PRINT"  FOR LONG THROW,PRESS KEY  F1  "
3230 PRINT"  FOR MEDIUM THROW,PRESS KEY
 F3  "
3240 PRINT"  FOR SHORT THROW PRESS KEY
 F5  "
3250 PRINT"  IF A SUB GETS THROUGH IT WILL
SURFACE"
3260 PRINT"AND DESTROY PART OF YOUR
DEFENSIVE WALL."
3270 PRINT"THE BONUS IS THEN RESET
3280 PRINT TAB(4)   PRESS ANY KEY
3290 POKE195,0 WAIT198,1 RETURN
4000 REM+++DATA FOR SPRITE 1(ROCK)+++
4010 DATA 0 0 0 0,0,0,0,0,0 0 0,0
4020 DATA 0,0 0 0,0 0 0,0,0 0,0,0,0 0
4030 DATA 0 15 0 0 62,64,0 63,64 0 255
4040 DATA 144 0 255,144,0 255,144,
4050 DATA 255 144,0 255 30 0,254
4060 DATA 57 64 0 57 64 0 5,0 0
4100 REM+++DATA FOR SPRITE 0(SUB)+++
4110 DATA 0 0,0 0 0 0,0 0 0,0,0,0
4120 DATA 0 12 0 0,8 0 0 8,0,0,8,0
4130 DATA 0,6,0,0 26 0 0,28,0,0 20,
4140 DATA 0,  ,0,0,23 0 23,255,120
4150 DATA 127,255 192 127 132 224
4160 DATA 127,255,192 63,255,126,0 0,0
4170 DATA 0,0,0
5000
5010
5020 REM++++++++++++++++++++++++++
5030 REM++++++++++++++++++++++++++
5040 REM+++                    +++
5050 REM+++ MINI-SUB CONQUEST  +++
5060 REM+++                    +++
5070 REM+++ BY STEVE PHILLIPS  +++
5080 REM+++                    +++
5090 REM+++   COMMODORE 64     +++
5100 REM+++                    +++
5110 REM+++  2ND APRIL 1984    +++
5120 REM+++                    +++
5130 REM++++++++++++++++++++++++++
5140 REM++++++++++++++++++++++++++
```



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Open Forum is for you to publish your programs and ideas. Take care that the listings you send in are all bug-free. Your documentation should start with a general description of the program and what it does and then give some detail of how the program is constructed.

Windows

on QL

This program is designed to illustrate the *Window* facility on the QL. Four new windows will be opened, one in each corner of the screen, covering the whole of the display area. In each window a different type of graphical pattern is drawn, these patterns are described below.

In the top left hand corner, filled circles are drawn at random positions in random colours. In the top right hand corner filled squares are drawn at random positions in random colours. In the bottom left hand corner filled ellipses are drawn and in the bottom right hand window filled triangles are drawn at random positions in random colours. A border is also set up around each window.

The program will *Run* indefinitely, and should be stopped by pressing *Ctrl* and *Space* together.

```
100 REMark WINDOWS BY ANDREW FILBY
110 OPEN#5,scr_256x128a0x0
120 PAPER#5,0:CLS#5
130 INK#5,7
140 BORDER#5,15,1
150 SCALE#5,100,0,0
160 OPEN#6,scr_256x128a256x128
170 INK#6,0
180 PAPER#6,2:CLS#6
190 BORDER#6,15,3
200 SCALE#6,100,0,0
210 OPEN#7,scr_256x128a256x0
220 INK#7,0
230 PAPER#7,7:CLS#7
240 BORDER#7,15,6
250 SCALE#7,100,0,0
260 OPEN#8,scr_256x128a0x128
270 INK#8,0
```

Arcade Avenue

Room to move

Continuing on the subject of *Jet Set Willy* hacking from last week — here is Ben Caunce's table showing the memory locations of the various rooms

Address (Hex)	Room Title
C000	Off Licence
C100	The Bridge
C200	Under Megatree
C300	Foot of Megatree
C400	The Drive
C500	Security Guard
C600	Entrance to Hades
C700	Cuckoo's Nest
C800	Inside Megatree
C900	Branch Over Drive
CA00	Front Door
CB00	Hall
CC00	Tree Top
CD00	Out On A Limb
CE00	Rescue Esmeralda
CF00	Seen This Before
D000	Quirkafleeg
D100	Battlements
D200	On Roof
D300	Forgotten Abbey
D400	Ballroom East
D500	Ballroom West
D600	Main Stairway
D700	Kitchen
D800	West of Kitchen
D900	Cold Store
DA00	East Wall Base
DB00	Chapel
DC00	First Landing
DD00	Nightmare Room
DE00	Banyan Tree
DF00	Swimming Pool
E000	Half Way Up East Wall
E100	Bathroom
E200	Top Landing
E300	Master Bedroom
E400	Bit Of Tree
E500	Orangery
E600	Priest's Hole
E700	Generator Room
E800	Dr Jones
E900	The Attic
EA00	Under The Roof
EB00	The Conservatory
EC00	On Top Of House
ED00	Under The Drive
EE00	Tree Root
EF00	NOT USED
F000	Nomen Luni
F100	Wine Cellar
F200	Watchtower
F300	Tree Shed
F400	Back Stairs
F500	Back Door
F600	West Wing
F700	West Bedroom
F800	West Wing Roof
F900	Above West Bedroom
FA00	The Beach
FB00	The Yacht
FC00	The Bow

What I find particularly interesting is the room at EF00 which is not used. Using the information given in this article it seems not impossible that you could add your own room to the game. If anyone is clever enough to do this or even uses one of the 'JSW Designer' programs I mentioned a few weeks ago, then I'll see about arrancopy then I'll see about arranging a small prize for the best 'new room'. Anyway let's go on with Ben's letter which has still more useful tips: "I have also found a hidden object on the First Landing which is impossible to reach without modifying the room layout. To alter the room and retrieve it as you walk towards the cross *Poke* 53642,0, *Poke* 56350,0; *Poke* 56357,170.

The following *Pokes* are also useful (some are necessary): *Poke* 42183,11 and *Poke* 59901,82 will remove the Attic problems (and Graeme Carrot also points out that *Poke* 59900,255 will do the same).

Poke 56876,4 improves the Banyan Tree layout. *Poke* 60231,0 improves the 'conservatory' layout. *Poke* 50652,170 and 50653,170 blocks off the 'Entrance to Hades (who wants to go there?). *Poke* 50512,168; 50520,168 and 50528,170 puts a ledge in the 'Security Guards' so that you can get under the Drive without going through the Forgotten Abbey. *Poke* 54814,0 removes the annoying 'star' on the Main Stairway. *Poke* 57411,160; 57362,26, 57464,178 makes life a little safer in Priest's Hole. The following *Pokes* make it possible to travel from The Bow to Off Licence and vice versa — *Poke* 64610,21, 64632,85, 64633,85, 64634,85, 64635,4, 49386,60, 49253,0; 49371,0."

So thank you very much, Ben for that fascinating letter.

Tony Kendle

The Arcade Corner is a new section for anyone who enjoys playing arcade games. If you have any comments from playing tips on difficult games or programs you particularly like to praise (or blame!) then write to Tony Kendle, *Arcade Avenue, Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

```
280 PAPER#8,4:FILL#8
290 BORDER#8,15,5
300 SCALE#8,100,0,0
310 INK 7:CURSOR 40,103:FLASH 1:CSIZE 4,1:PRINT"WINDOWS BY ANDREW FILBY":F
LASH 0
320 REPeat loop
330 window_1
340 window_2
350 window_3
360 window_4
370 END REPeat loop
380 DEFine PROCedure window_1
390 INK#5,RND(0 TO 7):FILL#5,1:CIRCLE#5,RND(0 TO 149),RND(0 TO 150),RND(0 T
0 50):FILL#5,0
400 END DEFine
410 DEFine PROCedure window_2
420 FILL#6,1:INK#6,RND(0 TO 7):a=RND(0 TO 100):l=RND(0 TO 149):LINE#6,l,a T
0 RND(0 TO 149),RND(0 TO 100) TO RND(0 TO 149),RND(0 TO 100) TO l,a:FILL#6,
0
430 END DEFine
440 DEFine PROCedure window_3
450 a=RND(0 TO 100):b=RND(0 TO 149):e=RND(0 TO 30) TO
460 INK#7,RND(0 TO 7):FILL#7,1:LINE#7,l,a TO l,a+e TO l+e,a+e TO l+e,a TO l
,a:FILL#7,0
470 END DEFine
480 DEFine PROCedure window_4
490 FILL#8,1:INK#8,RND(0 TO 7):CIRCLE#8,RND(0 TO 149),RND(0 TO 100),RND(0 T
0 50),RND,RND(0 TO (2*PI)):FILL#8,0
500 END DEFine
```

Windows
by A Filby

Baud Walk

Special interest

If you spend a lot of time trying to contact people on the telephone, you will have noticed that the chances are that only one in three calls actually get you through to the person you want to chat to.

And its even more annoying and expensive when you are making a long distance call.

Well, now the UK's cheapest electronic mail service — which was previously only available in London — has been extended nationwide.

That means that for the price of a local telephone call and a small subscription of £20 per year you can get on to electronic mail send messages, greetings, arrange blind dates and talk to other baud walkers.

The system actually sits on the Prestel network and at only £20 a year its almost worth joining just to access the Picotel pages. There are at least another 10,000 micro users hooked up too, courtesy of the Micronet 800 service.

The electronic mail system on Prestel comes complete with a directory of other users and a number of special interest groups.

Every subscriber is given an individual 10-digit address number which you complete on pre-formatted pages — most message pages take up to 120 words a time.

Viewdata software marketed by a number of companies with their modems also allows you to prepare your messages before going on-line, thus cutting out even more telephone costs.

I use this mailbox facility frequently to get in touch with people on the move or when I'm at home tinkering with my micro at midnight and run into problems. I have sometimes mailboxed somebody on the network I know who might have the answer. Invariably next day there is their reply sitting in my mailbox store — ready for me to use, save back to store or delete from the system.

The biggest advantage for baud walkers on electronic mail systems is the special interest groups. Nobody has yet devised a directory of category of index, that would be really useful. Imagine being able to mailbox everybody, for example, who was struggling with a particular adventure game — every one could help each other to solve the puzzles.

Imagine too starting your own special interest group. You could post the message on any one of Prestel's notice board services, collect the replies and from then on run your own club, all via electronic mail.

The disadvantage of this cheap form of electronic mail is its limitations — but then you can't have everything. Expect too, some report about junk electronic mail.

● Next week the UK's cheapest 300/300 modem is launched.

Robin Wilkinson

Baud Walk is a new weekly column with news on networking, databases, reviews of modems and software and points of contact for information.

Any readers with experience of networking are asked to send their experiences or news of services to Robin Wilkinson, Baud Walk, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

He can also be contacted on Prestel mailbox 018083727.

Matrice

on Vic 20

This unexpanded program should be easily adopted for any 'Basic speaking' machine. It consists of two programs which are joined together Each one can be used separately
(1) The first program is located between lines 90-940 (and includes the subroutine in 1500) It allows you to enter a matrice and it will calculate the determinant and the inverse matric
(2) The second program is located between lines 970-1430 It will multiply 2 matrices given by the user

Example
3x+5+z=1
x+2y+3z=0
12x+3y−z=1

Type '1' to get the first program. The computer will ask you the size of the matric which is here 3.Type in 3 Then introduce 3/5/1/1/2/3/2/3./−1 You'll get 1 as determinant of the system. Then you'll get the inverse matrix.

Press '1' to go on with equation of any offer key to stop If you pressed '1', you are asked for the 3 numbers following the = sign which are 1,0 and −1 Enter them and you'll get the result.

```
1 rem ###############
2 rem #  matrices   #
3 rem ###############
4 rem #  copyright  #
5 rem # cyril aubry #
6 rem ###############
7 rem # october  83 #
8 rem ###############
9 printchr$(14)
82 print " print      "Matrices  print "
Menu" print
83 print "1.To calculate" printtab(4)
"-Determinant  printtab(4)"-Inverse matrix"
84 printtab(4) "-Equations' print "2.To
multiply a ,n,               a b 1 
85 geta$ ifa$<>"1 anda$<> 2'then85
87 ifa$="1'thenrun90
88 ifa$= 2 thenrun970
90 rem calculates the determinant of a sized n matrix
100 print "
110 print "Size of matrix a ,
120 input
130 dima(n,n)
140 dimb(n,n)
150 dimc(n,n)
160 dimd(n,n)
170 forl=1ton
180 forc=1ton
190 print"a(",l, ,",c,")"
200 inputa(l,c)
210 b(l,c)=a(l,c)
220 nextc
230 nextl
240 rem results-inverse matrix
260 print "
270 forq=1ton-1
280 gosub1500
290 forz=1ton
300 b(z,z)=b(z,z)-s/q
310 nextz
320 forl=1ton
330 forc=1ton
340 forz=1ton
350 d(l,c)=d(l,c)+a(l,z)*b(z,c)
360 nextz
370 nextc
380 nextl
390 forl=1ton
400 forc=1ton
410 c(l,c)=b(l,c)
420 b(l,c)=d(l,c)
430 d(l,c)=0
440 nextc
450 nextl
460 nextq
470 gosub1500
480 c=1
490 forz=1ton-1
500 c=-c
510 nextz
```

The Music Box

Sound chip

We all know about the revolution brought about in the few years that followed Intel's introduction of the first microprocessor chip — the antique 4040, best known as the progenitor of a million games of video tennis. The 4040 is now seen with something approaching religious awe.

As far as computer music is concerned, similar veneration probably awaits another chip — General Instrument's AY-3-8910 which, along with its somewhat less elaborate stablemate, the AY-3-8912, was probably the first fully digital programmable sound generator to reach the market-place. The 8912 is built in to the Oric 1 and Oric Atmos, while the 8910 is the chip chosen by the MSX manufacturers for their standard sound output features.

These chips have been popular with home constructors for some time, as has the Texas Instrument's near-equivalent, the SN76489, which is the chip used in the BBC micro to produce sound.

Most current PSGs are fairly simple devices The 76489, for example, isn't even properly addressable — it is, effectively, connected to an eight-bit data bus and the registers within it (the three tone generators and one noise generator) are addressed via this bus If the chip had to have a large number of facilities, such an approach would be impossibly time consuming

As a result, the features of these basic chips are extremely limited. Nonetheless the principle of the PSG allows us, in theory to produce an entire synthesiser on a single chip and to control it from software.

The most advanced PSG in common use is the Mostek 6581, available only on Commodore machines Commodore Basic, being what is is, makes handling the 6581 an extremely tedious matter (there are 29 different registers in the chip which must be individually *Poked* or *Peeked* to make anything happen) But then there are an increasing number of hardware and software add-ons to enable you to get the most out of this remarkable chip

Just one item of news in this connection. The designer of the 6581 was a certain Bob Yannes Bob left MOS Technology (the Commodore-owned company which produces Mostek chips) some time ago Recently, he and his brother Dave have surfaced at the helm of a company called Peripheral Visions Inc (Great Valley Parkway, Malvern, Pennsylvania 19355, USA) PVI have just announced an Apple add-on called the DrumKey — apparently everything you ever wanted from a drum synth and selling at only $239 95

Percussion synthesis is certainly one of the current things for the serious computer musician and it will be interesting to see whether the DrumKey (which includes a new Yannes designed custom chip) comes up to the same standard in this area that the 6581 has set in the PSG field. To hear the device at 3000-miles distance, you can ring 0101-215-647-3930

Gary Herman

The Music Box is a new weekly column with news reviews and readers comment on all aspects of micros and music

Any readers with experience of computer music making or companies with new product news are invited to write to. drop a line explaining what they're doing to: Gary Herman, The Music Box, 12-13 Little Newport Street, London WC2R 3LD

```
520 z=z/n*c
550 Print" The determinant o[illegible] z
560 ifz=0thengoto940
570 Print "The inverse matri[illegible]
580 forl=1ton
590 forc=1ton
610 c(l,c)=c(l,c)*n/z
620 Print" inv( ,l," ,c, )=" int(100*c(l,c))/100
625 [illegible]
630 nextc
640 nextl
700 Print "In order to solve
[illegible] int type 1 [illegible]
710 [illegible]
711 [illegible] 1"thenend
730 Print [illegible]
740 Print enter results [illegible]
750 dim[illegible]
760 dim [illegible]
770 forl=1ton
[illegible]
[illegible]
[illegible] nextl
[illegible] Print [illegible]
[illegible] Print" The solutio[illegible]
[illegible]
[illegible] forl=1[illegible]
[illegible] for[illegible]
[illegible]
[illegible] nextc
[illegible] Printtab[illegible]
[illegible] nextl
[illegible]
[illegible] Print [illegible] What [illegible]
[illegible] matrix [illegible]
970 [illegible]
[illegible] Print [illegible]
[illegible]
1000 [illegible]
1010 Print number [illegible]
[illegible]
1040 [illegible]
[illegible]
[illegible]
[illegible]
1080 next[illegible]
1090 next[illegible]
1100 Print [illegible]
1110 Print matri[illegible]
1120 [illegible]
1130 dim[illegible]
1140 for[illegible]
1150 forn=1to[illegible]
1160 Print [illegible]
1170 input[illegible]
1180 nextn
1190 next[illegible]
1230 dim[illegible]
1240 for[illegible]
1250 forn=1to[illegible]
1260 for k=1to[illegible]
1270 [illegible]
1280 nextk
1290 next[illegible]
1300 next[illegible]
1330 [illegible] Print [illegible]
1350 for[illegible]=1to
1360 forn=1to[illegible]
1370 Pri[illegible]
1390 [illegible]
1400 next[illegible]
1410 nextl
1430 end
1500 s=0
1510 forz=1to[illegible]
1520 s=s+[illegible]
1530 nextz
1540 return
```

Matric
by Cyril Aubry

Microradio

GW6JJN

Answer back

A large number of readers have enquired about radio teletype (RTTY) programs for the Commodore 64 computer More and more radio software is coming along for this machine and about the best RTTY program I have seen comes from Grosvenor Software of 22, Grosvenor Road, Seaford, East Sussex BN25 2BS

The program's title is *RTTY Transceive* for the Commodore 64 and is available either on cassette at £14 or disc at £16 Written entirely in machine code, the program is professionally presented and includes extensive instructions on how to use the facilities available, and there are plenty of those In addition to the program, the user will need a suitable RTTY terminal unit/ interface between the computer and the radio Many of you will already have one, but if not a unit including all leads is available from PNP Communications in conjunction with Grosvenor Ring 0323 893378 for more details.

The program operates in split-screen mode This means that in-coming messages are received at the top part of the screen and you are able to compose a reply during receive, the reply being stored in a 1000 character buffer and displayed in the lower half of the screen. When you are ready to transmit you press a key and out goes your response You can type ahead during transmission or you can send previously prepared pages of text which can be stored in any of ten memories of 480 characters.

The selection of baud rate is software controlled between 20 and 250 baud. This will cope with just about everything in RTTY The really cunning thing about this program is that it will tell you the baud rate of an incoming signal. I found this very impressive, it is something I have never seen before in such a package and is typical of the attention to detail displayed throughout.

Other features include automatic answer-back for radio mailboxes, in-built call-sign of user, the ability to remember all received and transmitted messages for later review The function keys on the 64 are used for control of the major aspects of the program such as receive, transmit etc and a real-time clock is constantly displayed on screen and is available to send. On the whole this is a well thought-out program which is both efficient and easy to use The features of the Commodore 64 have been used to full effect indicating that it has been written specially for the 64 and not cobbled together from a bunch of routines intended for something else

There is a great deal of radio software appearing recently but I can honestly say that very little of it compares in features or quality to Grosvenor's RTTY for the Commodore 64 Here we have the unique combination of the ultimate in radio software along with excellent value for money Another winner from the author, M J Kerry G4BMK.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered write to Ray Berry *Microradio Popular Computing Weekly* 12-13 Little Newport Street London WC2R 3LD

Tony Bridge's Adventure Corner



Rubic's cube

Although we still have a lot of new adventures to get through (they're coming in thick and fast now — but should we complain?), I'm going to put them on one side for a week, and give some badly-needed help.

Now that the Infocom adventures are at last available for a reasonable £11 or so (although, of course, only on disc drive — don't hold your breath for tape versions, it's probably not possible!) — many more adventurers are being introduced to the delights of the *Zork Triology*, *Planetfall* and *Deadline* among others. Mr D Feal of London H1 went out and bought the whole trilogy. *Zork I* brings the following problems with it "How do I pass Hage's entrance? 11,29 and 41 "And how do I open the granting in the forest?" You'll need the 32,15,46,45.

As for *Zork III*. "What is the secret of the Puzzle Room? A difficult one to answer, Mr Feal! Suffice to say that the whole thing is rather like a giant Rubic's Cube, and the minimum number of moves — worked out with the aid of an algorithm constructed by Ken Matthews and friends — is 60 moves. The end result must be to move a ladder beneath a hole in the ceiling "How do I get the Crown Jewels?" You only need a small item from the Jewels, but 34,5,27,42 How do I get across the lake without getting my lamp wet?" 5,38 "How do I get through the rubble? "34 28,14,10 "And finally, I keept coming across a Viking ship with an old sailor on it. How do I board the ship?" This is a lovely example of why the Infocom adventures are so much more interesting than most others. in *Zork I*, the player will find a book, in the temple This says "Beware of saying Hello Sailor"! Working through the trilogy, one cannot resist the temptation, of course, to say just that at every opportunity! So, at that point, there's only one thing to do, isn't there?

As for your question about where to get hint sheets for Infocom games, my copies of the Infocom games (which I bought for a long time ago for, unfortunately, rather more than £11), go into great detail about the Infocom Hint Book and Nifty Map for each adventure — they're $7.95 each (plus tax and postage). Unless the Commodore versions are very different, you'll find the address in the documentation.

Mr R & C Garroway, from Swindon, has invested recently in a disc drive for his CMB64, and a copy of the complete trilogy He has collected 16 of the 20 treasures, but is now stuck. You've done very well, especially in getting the pot of gold and the huge diamond, but it is the jewelled egg which is holding you up now There is a treasure lying within which you cannot get out — you'll need to get someone else to do the job for you, so 12, 26, 44, 16, 20 48, 3, 36, 28. Incidentally have you looked in the buoy, in the river?

```
KET                SCORE=1%
  We are near a door in the
 east wall. It is 8' tall and
made of thick oak. There is a
   glass window above it.

>OPEN DOOR
        It is locked!
>EXAMINE WINDOW
  Yep! It's a glass window!
>BREAK WINDOW
 You cannot reach the glass.
>
```

From a trilogy on the Commodore, to a trilogy on the Spectrum — the *Ket Trilogy* has won an awful lot of fans, all trying, no doubt, for that video recorder that is the prize awaiting the first person to finish the *Final Mission* (if you see me wandering around with a load of smelly old hay, give me a wave!) David Bryan writes to me from Middlesborough about the first two parts, *Mountain of Ket* and *Temple of Vran*. In the first, he asks "How do I get past the skull?" This is the final puzzle, David, as you may know. Although you say that you have got many objects with you, only three are needed — 46,10 38,18,13. You'll find the first in the south plateau, the second in the little-used room and the third in the mountains As for the rope in *Temple of Vran*, tell your Dad, David, that he needs to 34,7,2,16,21,46 — then tie *rope* and *down*. *Lords of Time* about which I have had many letters is still a great favourite, and I shall devote a whole page to this great program soon. But for now, let me address just a couple of problems. "I must congratulate Sue Gazzard on the most exciting adventure game that I have tackled," says Mrs M Roberts of Pickering "How do I open the door to the invention room on zone 3?" 47 22 "Can I do anything with the Viking longship? 49 "Can I get past the scorpion, squids or seaweed in zone 4? And where is the treasure trove, mentioned on the parchment?" 88 and 36,8,34,24 16,50 "How do I get rid of The Black Knight and where is the sharp sword in zone 5?" 1,43,7,37 — 48,18,33,23,1,26

Finally she says "In Artic's *Golden Apple*, what do I do with the computer?" Just think of what the deranged parrot is saying, and act on it!

Finally, the clue I gave to complete *Temple of Vran* — two weeks ago — was actually the clue to complete *Mountains of Ket*. You must have the Magic Sword, the magic Armour, the Magic Ring and the magic Wand — drop everything else

Clue Words. 1 Give 2 Cliff 3 Thief 4 Get 5 Back 6 Drop 7 To 8 Stone 9 Tune 10 Hat 11 Bell 12 Carry 13 Beard 14 Before 15 From 16 And 17 In 18 Snow 19 Earthquake 20 Let 21 Feed 22 Eureka! 23 Will 24 Up 25 Down 26 It 27 Into 28 Through 29 Book 30 Crossing 31 Machine 32 Key 33 Queen 34 Go 35 Push 36 Nick 37 Prince 38 Lamp 39 Cloak 40 Before 41 Candle 42 Past 43 Sword 44 Around 45 Maze 46 The 47 Say 48 Elephant 49 No! 50 Easy

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Going bananas? If you are stuck in an Adventure with nowhere to turn do not despair — help is at hand

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This series of articles is designed for novice and experienced Adventurers alike. Each week Tony Bridge will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter. So if you have an Adventure you want reviewed, or if you are stuck in an Adventure and cannot progress any further write to, Tony Bridge, Adventure Corner, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.

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388	Magic Micro Mission	7 95	6 36
401	See Saw	7 95	6 36
400	Ant Attack	9 95	7 16
399	Zeppelin Rescue	8 50	7 60
398	High Noon	7 90	6 32
397	Stunt Bike	6 90	5 52
390	Kokotoni Wilf	6 95	5 56
395	Scrabble	14 95	11 96
394	Falcon Patrol II	7 95	6 36
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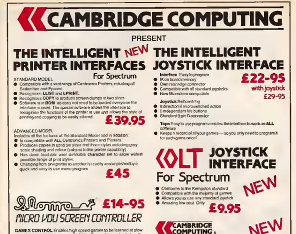
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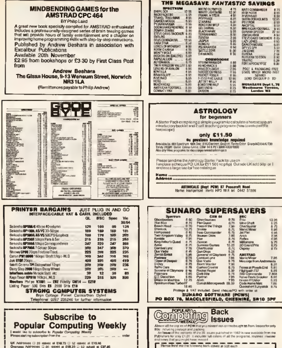
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Morse translator

C Parkes of Southend writes

Q **A few weeks ago your magazine published an address relating to a morse-code translater. grateful if you could either re-publish it or possibly send it to me.**

A The program to which I think you refer was reviewed in the Microradio column in Vol. 3 No 22 (31st May) It is available from. Pinehurst Data Studios, 69 Pinehurst Park, West Moors, Wimbourne, Dorset BH22 0RP The price for the ZX81 version is £7.00 I do not have a price for the Spectrum version.

Columns of keys

Robert Somerville of Dumfries, writes

Q **I own an 18 month old Spectrum, which is now out of guarantee. I wish to purchase a new keyboard membrane for it, as a column of keys has stopped working. Could you give the name of a company that would supply these membranes by mail order?**

A The Spectrum keyboard is certainly the weak link in this particular Sinclair chain. Perhaps you should consider buying one of the excellent replacement keyboards.

If you want to stick with the original, you will be hard pressed to actually buy one, as it has become Sinclair policy to discourage shops from selling Spectrum components direct to third parties However a number of companies can replace membranes one of these being RA Electronics, who can be telephoned on 0502 66289.

Picture quality

Richard Bennett of Tarporley, Cheshire, writes

Q **I have noticed a couple of adverts recently for units which enable the Spectrum's sound to be fed to the TV speaker As they are about the same price as amplifiers I was wondering whether they are as effective and whether they affect picture quality?**

A By and large these units are not as effective, on their own, as an amplifier They usually use the TV amplification system and merely feed the computer sound signals through that As they utilise the normal TV sound system they will have no effect on picture quality

Spectrum queries

David Cowler of Hemel Hempstead, Herts writes

Q **After having just finished reading PCW, I felt that for the first time ever in my two years computing, I must write to a computer magazine. I have a number of queries which compelled me to write to you about my Spectrum.**

1. How do you disable Break?

2. How do you disable List?

3. How do you disable Save?

4. Is there any way of testing to see if the Break key is being pressed?

5 What is the best available book (or cassette) which thoroughly explains Spectrum machine code?

A Phew

OK here we go.

1) *Break* is normally disabled by setting the *Err Sp* system variable to zero This causes the machine to *New* if *Break* is pressed during the running of your program.

2. My favourite method of disabling *List* is to scramble the keyword tokens in the character set That is, change the *Save* keyword to *Load*, change *Let* to *List*, etc This produces such a mucked up listing as to make it unusable

3 Basically, if someone has broken in to your program then disabling *Save* is not really going to achieve very much. By far the best method of achieving program protection is to disable the keyboard scanning routine, and do all reading of keys yourself

4 The ROM routine at 1F54 tests for the *Break* (and also for *Shift* and *Break*) It is a very small routine and can be used from within one of your own programs

5 *Z80 Language Programming* by Lance Leventhal is one of the most comprehensive works on the subject

Which system?

K D Outtendge of Didcot, Oxfordshire writes

Q **My problem is probably not a common one, but I should be very grateful if you could help me Having been using main-frame computers for scientific computing for 20 years or so, and having recently retired, I should like to buy a home computer to continue some of the projects (using Fortran translating to Basic) which were never finished at work**

The problem is that I have costed my requirements — word processing, disc drive (single or double), at least 64K Ram, preferably a 16-bit processor, cassette recording capability (compatible with TI99/4A), good graphics and colour — for several different systems, including the BBC and the total always seems to amount to around £1300

I have an aversion to the Commodore 64 which would be less at £800 or so. It eventually penetrated my skull that a small business computer might suit me, and the two models I came up with are. Sanyo model MBC 555 — £1148 with 128K and twin disc-drive and the Sanyo model 550 — £862 with 128K and single disc drive What do you think?

A Well you obviously know what you want — now all you have to do is find it

Of the two Sanyo machines you mention — which seem quite sensible — my preference would be for the MBC 555 The double disc drive gives you the ability to copy disc to disc (for security) and also increases the amount of on-line data storage at your command for work processing

It is extremely unlikely that you will be able to achieve TI 99/4A cassette compatibility, no matter what system you buy

So, unless you could write a machine code program to read and list the contents of a TI cassette, or borrow one, I am afraid you have had it.

One last thought as you are converting Fortran programs, why convert them to Basic? If the Sanyo computers have a Pascal compiler available you might find that that conversion was less tiresome, and that the programs ran a lot faster than with Basic.

Modem plug-in

Wendy Best of Nottingham, writes

Q **I own a Vic20 and I would like to buy an inexpensive telecommunications modem to plug in the back. Could you tell me how much they cost and where I could get one from?**

A The Maplin modem at about £40 is probably the cheapest way into the communications area. Maplin also provide an interface to allow this modem to be connected to the Vic20 (via RS232C) You can contact Maplin on 0702 552911

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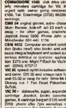
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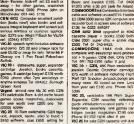
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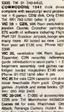
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COMPUTER SWAP

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WANTED NON-WORKING Dragon Spectrum, Vic20 or Pet in any condition. Phone 036287 327

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WANTED SPECTRUM 48k in working condition £50 or Spectrum 48k and microdrive £90. Willing to negotiate. Phone 0706 854745 (Paul)

WANTED COMMUNICATION software to run modem from Dragon 32 Maplin serial interface or from Dragon 64. Please phone 01-821 1710 after 7pm

WANTED EX. BASIC for TI99-4A also any other hardware or software. Details please to Ken Llangefni 724636 N. Wales

APECTRUM 48K wanted will swap my AK1A HX 3 stereo cassette deck now (unwanted gift) Cost £100 phone Freddy 0248 24994/24208

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WANTED ANY ZX81 software or hardware. Will exchange for Spectrum Hunter Killer and Ship Of Line or will buy. Tel 0278 445204

SWAP TRIO (27 watts per channel) stereo amplifier + matching tuner for CBM 64 peripheral. Office tel 01-934 3187 R G Forster

WANTED ORIC 1 5.25in. Disc drive and D O S or any help to achieve it. Phone Blackpool (0253) 49493 Kevan evenings

WANTED TO BUY software for BBC Dragon or Spectrum. Phone 09285 60635 Sundays only

SWAP MY QUICKSHOT 11 for Kempston 5000 or Suncom Tac 2. Write to Stephen at 55 Eistead Road, West Vale, Kirkby, Liverpool L32 4TE

WANTED MZ80K exp 80x MZ8010 tables — cord coupler £75. Ring John — on 021 551-6427

ADVENTURE HELPLINE

The Hobbit on Spectrum. Once through the wine cellar, how do you find lake town and 'bard'? where is the key for the mountainside door? John Osbourne, 38 Edwin Avenue, Woodbridge, Suffolk.

Voodoo Castle on BBC How do you get the ju ju bag? Jason Wright, 99 Carter Drive, Collier Row, Romford, Essex.

Adventureland on Vic20 I am stuck at the royal chamber. When you say Help it says 'Blow it up' Blow what up??? Matthew Foster, 18 Johnstone Close, Wrockwardine Wood, Telford, Shropshire.

Countdown to Doom on BBC How do I get past the robot at the screen of light? John Beman, 5 Church Lane, Elvington, N Yorks.

Ship of Doom on Spectrum. I cannot get the key from the glass cover or release the body from the ice. Any clues please? Jay Pannett, 3 Forest View, Hailsham, Sussex.

Espionage Island and Golden Apple on Spectrum. I cannot get past the tank in the first and the crocodile in the second. Andrew Cameron, 51 Backwoods Lane, Lindfield, W Sussex.

Tombs of Xeiops on Commodore 64 How do I get pas the keeper of the tombs—I have been everywhere else and my score is only 87 out of 100? Is the pyramid of any use? S P Lotterill, 38 Barnet Road, Stockland Green, Erdington, Birmingham.

Circus on Atari. How do I get shot from the cannon without getting killed? Craig Hornby, 12 Penyghent Avenue, Burnholme, York.

Inca Curse On Spectrum. How do I get past the sand dungeon? R Foster, 67 Bushfield Road, Wath-on-Dearne, Rotherham, S Yorks.

Hobbit on Spectrum. How do I get the goblin's ring and how do I get across the fast black river? Scott Fountain, 6 Abinger Road, Pokesdown, Bournemouth.

Zork I on Commodore 64. How do I get the coffin out of the temple? How do I move the platinum bar? How do I see the cage in the shaft? Brendan Bradley, 64 Ashwood Road, Clondalkin, Co Dublin, Ireland.

Hobbit on Commodore 64. I cannot take the treasure. Richard Howlett, 9 Avondale road, South Benfleet, Essex.

Hobbit on Spectrum. How do you get away from the Elf clearing into the elf kingdom? Nicholas Metcalfe, 34 Crossmead, Eltham, London SE9

Pyramid of Doom on TI99/4A. I cannot get into the pyramid. Can you help? Paul Jeffrey, 31 Pinetrees, Weston Favell, Northampton.

Colditz Adventure on BBC Having escaped from the castel I cannot find the map to show the way to freedom. David Quinn, 35 Longhill Avenue, Ayr, Ayrshire, Scotland.

Hobbit on Commodore 64 I am trapped in the goblins dungeon. I have found the key and I have the sword, the rope, the golden key, the map and the curious key. Chris Barnes 19 Scafwell Way, Clifton, Nottingham.

Hobbit on Spectrum. How do I escape from the goblins dungeon? How do I escape down the river from the elvenkings halls? James Haslam, 6 Sittingbourne Avenue, Bush Hill Park, Enfield, Mddx.

Valhalla on Spectrum. I cannot find Ofnir and I have had the program for three months now. Help! Paul Waggett, 9 Lexton Drive, Churchtown, Southport, Merseyside.

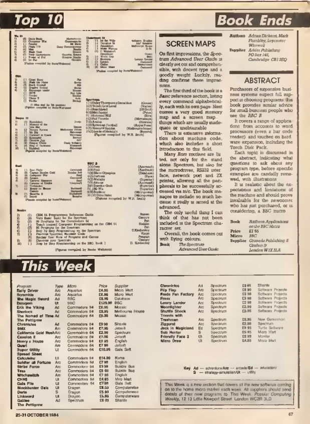
Curse of the Werewolf on Vic20 How do you get into the castle that is guarded by the zombee. Guy Cliffe-Jones, 95 Somerset Road, Edgbaston, Birmingham.

Hobbit on Commodore 64. Terrible to admit but I cannot get beyond 75% of the adventure. Help please. D A Sidey, 11 Romley Close, Basingstoke, Hants.

Franklin's Tomb on Dragon. I am stuck with the cave system which I cannot get out of. Charles Beighton, 25 Penland Road, Haywards Heath, West Sussex

Diary

Event	Dates	Venue	Admission	Organisers
Electron and BBC Micro User Show	Oct 25-27 10.00am-6.00pm Oct 28 10.00am-4.00pm	Alexandra Palace London N22	£2.50 adults £2.30 children	Database Publications 061-[illegible]
Micro Tech 84	Oct 26-29 10.30am-6.00pm	[illegible] Exhibition Centre	£1.50 adults £1.00 children	Promotions Exhibitions 0273 [illegible]
Computers in School	Oct 30 10.00am-5.00pm Oct 31 10.30am-5.00pm Nov 1 10.00am-5.00pm	Anderson Centre Glasgow	Free	Trade Exhibitions 041 [illegible]
Mycomp (Thames Valley Personal Computer Exhibition)	Nov 1-3 10.30am-6.30pm Nov 4 11.00am-5.00pm	Fulcrum Centre Slough	£2.00 adults £1.00 children	[illegible] Special Events [illegible]
Micro Computer Show	Nov 7 3.00pm-6.00pm Nov 8-10 12.00pm-10.00pm Nov 11 10.00am-4.00pm	Royal Dublin Society (Main Hall) Ballsbridge Dublin 4	£2.00 adults £1.00 children	SDL Exhibitions Dublin [illegible]
Scottish Home Computer Fair	Nov 10 10.00am-5.30pm	[illegible] Pavilion Gardens [illegible]	£1.00 adults 50p children	Technical Promotions [illegible]
Micro Computer Exhibition	Nov 10 10.00am-5.30pm	David Davies Gallery Newtown Powys Wales	30p	Newtown and District Computer Club [illegible]
Microelectronics Applications	Nov 10 10.30am-4.00pm	[illegible] High School Burnley Lancs		[illegible] High School [illegible]
London Micro Market	Nov 10 10.00am-5.30pm Nov 11 10.00am-4.00pm	Wembley Exhibition Centre	£1.50 adults 75p children	ECC Publications 01-[illegible]
6809 Colour Show for Dragon and Tandy Users	Nov 17-18 10.00am-5.00pm	Royal Horticultural Halls London SW1	£2.00 adults £1.00 children	Computer Marketplace 01-[illegible]
Computer Auction	Nov 28 6.30pm	[illegible] Hotel Southampton Row London WC1	Free	Cracker Computer Auctions 01-[illegible]



Top 10

Vic 20

1)	(8)	Gusto Bonis	Mastertronic
2)	(1)	Computer War	Creative Sparks
3)	( )	Punchy	Mr Micro
4)	(3)	Flight 015	Dany Communications
5)	(4)	Mars	Bonzo
6)	(6)	Gush Gush	Boston
7)	(7)	Tank Commander	Creative Sparks
8)	( )	Tower of Evil	Creative Sparks
9)	(9)	Jet Pac	Creative

(Figures compiled by Boots/Websters)

Oric

1)	( )	Chess Bone	Pin
2)	(2)	Walk the Plank	Ocean
3)	(4)	Dark Crystal	PSS
4)	(3)	Zorgons Revenge	Ocean
5)	(5)	Espionage Island	Tansoft
	( )	3D TK	Bug Byte
	( )	Trooper	Rainbird
	( )	Chess 2	Artic
	( )	Vo-Ro	[illegible]

(5 titles tied for 5th position)
(Figures compiled by Boots/Websters)

Dragon 32

1)	(3)	Buzzard Bait	Ovie
2)	( )	Mystery of the Java Star	Shards
3)	(1)	Hungry Horace	Melbourne House
4)	(7)	5th Dig	Espionage
5)	( )	Cuthbert in Space	Microdeal
6)	(6)	Kriegspiel	Beyond
7)	(8)	Chuckie Egg	A&F
8)	(4)	Dragon Chess	Oasis Software
9)	(9)	Ring of Darkness	Wintersoft
10)	( )	Eightball	Espionage

(Figures compiled by Boots/Websters)

Atari

1)	( )	Sea Fight	Cornsoft
2)	(2)	Captain Sticky's Gold	English Soft
3)	(3)	Computer War	Atari
4)	(5)	Loco	Alligata
5)	( )	Carnival Massacre	Atari
	(6)	Caverns of Khafka	Cosmi
7)	(-)	Hellraider	[illegible]
	(-)	Mouse in the House Canada	[illegible]
9)	(1)	Shamus II	[illegible]
	(7)	Loyall	Imagine

(Figures compiled by Boots/Websters)

Commodore 64

1)	( )	Jet Set Willy	Software Projects
2)	(-)	Decathlon 64	A&F Creative
3)	( )	Decathlon	Melbourne House
4)	( )	Manic Miner	K-Tel
5)	(1)	C Whitaker's Decathlon	Ocean
6)	(-)	World Cup	Artic
7)	( )	Boulder	Lenson Zenson
8)	(3)	Zaxxon	Centresoft
9)	( )	Chiller	Mastertronic
10)	(2)	Manic Miner	Centresoft

(Figures compiled by Boots/Websters)

Spectrum

1 (1)	Daley Thompson's Decathlon	(Ocean)
2 (3)	Tolado Low Level	(Vortex)
3 (-)	Beachhead	(US Gold)
4 (4)	Matchpoint	(Psion)
5 ( )	Kokotoni Wilf	(Elite)
6 (2)	Full Throttle	(Micromega)
7 (6)	Avalon	(Hewson)
8 (9)	Sportscap Football	(Argus Press)
9 (5)	Sherlock Holmes	(Melbourne house)
10 (7)	Lords of Midnight	(Beyond)

(Figures compiled by W.H. Smith)

BBC B

1 (1)	Elite	(Acornsoft)
2 (6)	Frak	(Aardvark)
3 (4)	Micro Olympics	(Database)
4 (3)	Fortress	(Pace)
5 (7)	Wallaby	(Superior)
6 (5)	Aviator	(Acornsoft)
7 (8)	Smash & Grab	(Superior)
8 ( )	Mr Wiz	(Superior)
9 (9)	Stockcar	(Micropower)
10 (10)	Dune Rider	(Micropower)

(Figures compiled by W.H. Smith)

Books

1)	(1)	CBM 64 Programmers Reference Guide	Babani
2)	(3)	Very Basic Basic for the Spectrum	Century
3)	(8)	60 Programs for the Commodore 64	Pan
4)	( )	Teach yourself Computer Programming on the CBM 64	Hodder
5)	(7)	60 Programs for the Spectrum	Pan
6)	( )	Step by Step Programming on the Spectrum	D.Kindersley
7)	( )	Spectrum Machine Code	Virgin
	(5)	Sinclair User Guide of Programs and Games	Penguin
9)	(6)	Discover your Spectrum	Century
10)	( )	Step by Step Programming on the BBC, Book 1	D. Kindersley

(Figures compiled by Books Websters)

Book Ends

SCREEN MAPS

On first impressions, the *Spectrum Advanced User Guide* is clearly set out and comprehensible, with decent type and a goodly weight. Luckily, reading confirms these impressions.

The first third of the book is a *Basic* reference section, listing every command alphabetically, each with its own page. Next comes a very good memory map and a screen map — things which are usually inadequate or unobtainable.

There is extensive information about machine code, which also includes a short introduction to this field.

Many *Rom* routines are listed, not only for the stand alone Spectrum, but also for the microdrives, RS232 interface, network port and ZX printer, allowing all the peripherals to be successfully accessed via m/c. The book manages to include so much because it really is aimed at the advanced.

The only useful thing I can think of that has not been included is the Spectrum character set.

Overall, the book comes out with flying colours.

Book *The Spectrum Advanced User Guide*
Authors *Adrian Dickens, Mark Plumbley, Leycester Whewell*
Supplier *Adder Publishing, PO Box 148, Cambridge CB1 2EQ*

ABSTRACT

Purchasers of expensive business systems expect full support in choosing programs: this book provides similar advice for small business people who use the *BBC B*.

It covers a range of applications from accounts to word processors (even a bar code reader) and touches on hardware expansion, including the Torch Disk Pack.

Each topic is discussed in the abstract, indicating what questions to ask about any program type, before specific examples are candidly reviewed, with illustrations.

It is realistic about the expectations and limitations of the machine and should prove invaluable for the newcomer who has just purchased, or is considering, a BBC micro.

Book *Business Applications on the BBC Micro*
Price £7.95
Micro *BBC*
Supplier *Granada Publishing & Grafton St London W1X 3LA*

This Week

Program	Type	Micro	Price	Supplier
Rally Driver	Arc	Aquarius	£4.95	Micro Mart
Scramble	Arc	Aquarius	£8.95	Micro Mart
The Magic Sword	Ad	BBC	£8.95	Database
Datagem	Ut	BBC	£129.99	BBC
Erik the Viking	Ad	Commodore 64	£8.95	Mozaic
Sherlock	Ad	Commodore 64	£8.95	Melbourne House
The Nomad of Time	Ad	Commodore 64	£9.95	Mozaic
The Pettigrew Chronicles	Ad	Commodore 64	£9.99	Shards
BMX	Arc	Commodore 64	£7.95	Jetsoft
California Gold Rush	Arc	Commodore 64	£2.99	Spectrum
Cavelon II	Arc	Commodore 64	£7.95	Jetsoft
Henry's House	Arc	Commodore 64	£8.95	English
Quarl	Arc	Commodore 64	£7.99	Jetsoft
Super Utility	Ut	Commodore 64	£10.95	Gala Soft
Spread Sheet Calculator	Ut	Commodore 64	£14.99	Kuma
Soldier of Fortune	Arc	Commodore 64	£7.99	English
Strike Force	Arc	Commodore 64	£9.99	Bubble Bus
Tesa	Arc	Commodore 64	£6.99	Bubble Bus
Witchswitch	Arc	Commodore 64	£7.99	English
CHR$	Ut	Commodore 64	£4.95	Miro Mart
Gala File	Ut	Commodore 64	£7.95	Gala Soft
Blockbuster Gala	Ut	Dragon	£6.50	Computerwise
Darts	S	Dragon	£5.90	Computerwise
Linkword	Ut	Dragon	£6.95	Computerware
Galilee	Ad	Spectrum	£8.95	Shards
The Pettigrew Chronicles	Ad	Spectrum	£8.95	Shards
Flip Flap	Arc	Spectrum	£8.90	Software Projects
Freds Fan Factory	Arc	Spectrum	£2.99	Software Projects
Freex	Arc	Spectrum	£3.90	Software Projects
Loony Lander	Arc	Spectrum	£2.99	Software Projects
Moonlighter	Arc	Spectrum	£2.99	Software Projects
Shuttle Shock	Arc	Spectrum	£2.95	Software Projects
Travels with Trashman	Arc	Spectrum	£5.95	New Generation
Ziggurat	Arc	Spectrum	£2.99	Spectrum
Jack In Magicland	Ed	Spectrum	£9.95	Turtle Software
Sub Hunter	S	Spectrum	£6.95	Micro Mart
Friendly Face 2	Ut	Spectrum	£8.95	Moniter
Micro Draw	Ut	Spectrum	£4.95	Micro Mart

Key Ad — adventure/Arc — arcade/Ed — education/
S — strategy-simulation/Ut — utility

This Week is a new section that covers all the new software coming on to the home micro market each week. All suppliers should send details of their new programs to This Week, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD

New Releases

PICTURE SHOW

Projector 1 is a clever idea from McGraw Hill, designed for schools and businesses who want to display a series of graphics, graphs and other information.

The program contains not only graph drawing routines of various sorts, but also a choice of font styles. Having created a number of screens they can be presented in any order, with the delay between screens selected in advance or operated manually.

You can use the program very much like a slide projector, moving back and forth from picture to picture, returning to any particular one as often as you wish.

Program *Projector 1*
Price *£9.95*
Micro *Spectrum*
Supplier *McGraw Hill*
Shoppenhangers Road
Maidenhead
Berkshire SL6 2QL

WITTY

Mosaic should probably be credited with starting the idea of bookware where linked books and software are packaged together, although its first efforts were pretty disappointing. With *The Stainless Steel Rat saves the World*, things are looking up.

This time you get a pretty sophisticated machine code, graphically illustrated adventure in which you play James di Griz the stainless steel rat. The strength of the book (for me anyway) is in the sharpness and wit of the writing: thankfully the adventure too does not take itself too seriously.

There is a vocabulary of 200 words and the graphics are pretty good, although language analysis is simple verb, noun. Since much of the plot involves travelling through time, the first problem is to find the time helix and work out how to manipulate its four properties of spin, flux, resonance and phase — needless to say, I didn't get anywhere at all.

The worst that could be said of the program is that it lacks anything really new — the best that it captures the flavour of the book well and should keep Tony Bridge in letters for a good few months.

Program *The Stainless Steel Rat Saves The World*
Price *£9.95*
Micro *Commodore*
Supplier *Mosaic*
187 Upper Street
London N1 1RQ

DRAUGHTS

Superior Software has been fairly successful at producing BBC games — the company has now introduced a range of Commodore 64 material including, strangely perhaps, given the number of similar packages, *Chess* and *Draughts*.

Chess is one of those things that computers can do so superbly well (theoretically) that they cannot fail to win. Still, any sensible program is going to make sure you can avoid this inevitable alternative.

Draughts allows you a variety of different options — next worse move, take back, play best move, etc and will play at a variety of levels and speeds. One useful option for those who find the level of speed they have set is too slow is a 'play immediately' command which forces the computer to move.

If you want draughts for your Commodore 64 this one would seem to have all the features you could need.

Program *Draughts*
Price *£7.95*
Micro *Commodore*
Supplier *Superior Software*
Regent House
Skinner Lane
Leeds
LS7 1AX

Pick of the week

POT-POURRI

I always wonder about multi-player games on computers. For some social or ergonomic reaction, computers seem best suited for solo activities and I wonder whether multi-player games ever do well — has anyone ever seen one in any of the charts?

The above, of course, has nothing to do with any inherent failure on the part of the games. *The Prince* would seem to be excellent — in any event it won a prize.

The Prince is for four players and is a veritable pot-pourri of Machiavellian machinations between player and player, and player and machine. The objective is to become master of the Lore — chief bureaucrat to the Prince and all round power wielder. This is accomplished by discovering and presenting the appropriate tokens of succession.

The four players represent a landowner, a cleric, and merchant and a tipstaff, and are respectively named Grasper, Ambrose, Porcus and Fernado (some evidence of political bust revelled here, I think Margaret). Each role has inherent advantages, eg, Porcus dispenses money.

The actual game consists of each player taking turns buying and selling, using spies, violence and bribery to discover the whereabouts of each token. The castle can be searched as in a conventional adventure, moving around and using words like Look, Examine and Take to see what's there.

It's devious and enormous fun — I hope that there are enough computer owners with three friends out there to do it justice. Oh yeah, it has nice graphics too.

Program *The Prince*
Price *£7.95*
Micro *Spectrum*
Supplier *Cases Computer Simulations*
14 Langton Way
London SE3 7TL

CHEAP

Now this is a very good idea — a range of Quilled adventures for a mere £1.75, not only that, but the various titles are coded so that you can get an idea of the degree of difficulty of each adventure before you start. Each adventure is divided into two sections, side one outlines the story and gives you some hints, side two is the game itself.

Faerie is described as of advanced level and is the only one of the first crop of six adventures to follow the traditional dungeons, dragons and elvish path. Nevertheless, it has much to recommend it. For one thing it manages to be both

surreal in plot but logical in terms of conundrum solving at the same time.

There is a sort of dreamish air about *Faerie*, with an aura of innocance about it too. Snowmen, caves, granite chess pieces and magic circles all feature in the game and it is excellent. Nor are these Eighth Day adventures one day wonders, the cheat sheet on *Faerie* extends to three pages and I'm not going to give you a single clue.

Program *Faerie*
Price *£1.75*
Micro *Spectrum*
Supplier *Eighth Day Software*
18 Flaxhill
Moreton
Wirral
Merseyside L46 7UH

CAVEMAN

Fire Quest is another one of those games which describes itself as more than an arcade game having adventure overtones. What it is is a multi-screen arcade game which has overtones of *Horace and the Spiders* and, more particularly, *Ugh!*

Ugh! was an excellent arcade game involving a caveman collecting eggs; *Fire Quest* continues the caveman's adventures in search of fire over seven different adventures. All involve dodging things, mostly spiders and fireballs, climbing things (ladders) and swinging across vast gulfs.

It's all about fast reactions so is definitely for arcade, rather than adventure, fans — still, at least it doesn't include aliens. If you get past the final screen, there's a prize, what greater motivation do you need?

Program *Fire Quest*
Price *£8.95*
Micro *Commodore 64*
Supplier *The Edge*
31 Marden Lane
Covent Garden
London WC2

VIKING SAGA

The Saga of Erik the Viking is the latest of Mosaic's bookware packages — the original book by Terry Jones now has an adventure game based on it written for Mosaic by Level 9. Level 9 have produced a fairly compulsive graphic adventure with versions for the Spectrum, BBC and Commodore 64.

Obviously the various versions will have slightly different characteristics — the Commodore 64 edition took ages to draw its pictures, but that may not be true of the Spectrum version.

The graphics are pretty good, and more importantly perhaps, they have a sort of style — the Viking farm not only looks pretty but also looks vaguely like how you'd think such a farm would look.

As it is by Level 9 the adventure itself is pretty devious although it sticks to basic verb noun entry, there is much to explore and within the first few screens. Enough conundrums are introduced to keep it all interesting. I was really chuffed that I managed to solve one of them which is to do with some footprints.

Program *The Saga of Erik the Viking*
Price *£9.95*
Micro *Commodore 64*
Supplier *Mosaic*
John Wiley & Sons
Baffins Lane Chichester
Sussex PO19 1uD

SEQUEL

Pitfall has a sequel and it's called *Pitfall II*. Pitfall Harry, hero and adventurer, returns again to do battle and swim, jump, climb and run his way through the usual sprites.

The object of the game is to move Harry around various screens looking for his niece, the Raj diamond and a treacherous cat called Quickclaw, as a



bonus there are 28 bars of gold to collect.

There are a large number of different screens with ropes to swing on, pits to avoid, rivers to swim with nasty fish and platforms to run along. If you liked the first one, you're sure to like this.

Program *Pitfall II*
Price *£9.99*
Micro *Commodore 64*
Supplier *Activision*
CGL House
Goldings Hill
Loughton
Essex

CUTHBERT

Cuthbert rears his bespectacled heard yet again in *Cuthbert enters the Tombs of Doom* — for the Commodore 64. This one falls into the category of 'complicated arcade game' as you try to find your way (well, Cuthbert does) around over 200 rooms in which lurk nasty things, clues, chests to be opened and so on.

Cuthbert is equipped only with the Ray of Ra which lets him zap at the more feeble ghosts but mostly its better to keep him out of their way (I know how they feel). You can guess that with a couple of hundred locations there's going to be a sense of deja vu about them, but even so there is a variety.

The packaging is particularly nice — you get a neat little manual that gives you a few hints on how to master the first few sections and even has a map of the first 40 rooms. There is, inevitably perhaps, a prize at the end. One of the best Microdeal games in a while and reasonably priced too.

Program *Cuthberbert enters the Tombs of Doom*
Price *£6.95*
Micro *Commodore 64*
Supplier *Microdeal*
41 Truro Road St Austell
Cornwall PL25 5JE

UNORIGINAL

Rocket Roger is the sort of game title that makes my heart sink — you just know that the game concept will be boring and unoriginal, the programming technically professional but lacking real inspiration and the damn thing will sell by the sackfull.

Anyway, *Rocket Roger* has to walk run, jump and (it says here) thrust his way around the many caverns of an unknown planet. The idea is to collect vital power crystals and fight off the usual baddies.

It is, of course *Manic Miner* again except that there's far less wit and far less inspiration — if you want your 127th version of MM then this is the program for you.

Program *Rocket Roger*
Price *£7.95*
Micro *Commodore 64*
Supplier *Alligata*
1 Orange Street
Sheffield
S1 4DW

Compiled by Graham Taylor

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Chance confusion

Probably probability is one of the most confusing, and confused, topics around.

Take poor Prince Harry, nappies and all, so much depended upon him, because "If the Princess of Wales' second child is a girl she'll complete a pattern of births which beats almost astronomical odds — about one in 65,000 to be precise" (*Parents* magazine, October 1984).

Of course what *Parents* forgot to tell you is that if the second baby was a boy, then the odds on that pattern of births was also about one in 65536.

The odds on any pattern of 16 births is 2^{16}, be the child male or female. The actual probability that any child is male (or female) regardless of any previous pattern or history is approximately one in two.

Given the past history of royal birth presented in the article the odds on the second child being a boy were 11 to eight — the second child was more likely to be a boy.

The second child was more likely to be a boy if the present birth was related to previous royal births (royal genes?). And, if not, boy or girl is equally likely.

Examples abound of similar confusions in probability where the confusion is between what happens by chance and the sense we make from a sequence. Any sequence of 16 births is as likely as any other, though it may be interesting that first born were all boys and the second born were all girls (until Harry).

Take a rather less regal example. In a magazine there are eight reviews, for example, and two of the reviews are by the same person, call him/her *X* (the other six reviews are by six other people). There are 28 different combinations of two reviews, to choose any combination 'at random' means that each combination is as likely as any other to be chosen.

Therefore, of course, one is just as likely to choose two reviews by the same person as any other combination of reviews. To assert that a choice is not random because the two reviews are by the same person is a confusion on a par with that from *Parents* magazine. 'Randomness' is a facet of the selection procedure, not of the result of the selection. Incidentally, the probability of choosing *X* as at least one of the two reviewers is 13 out of 28 (or almost one in two) — that is probably surprising.

If you had to bet on one of the two reviewers being *X*, good odds would be three to one (you argue that the odds of choosing an *X* review are two to six) but really the fair odds are 15 to 13. If you had to bet on one person appearing (at whatever odds) one would, of course, choose prolific reviewer *X*. You are more likely to be wrong than right — but you are *least* likely to be wrong. *X* is the 'maximum likelihood' estimate, in that if you have to guess, choose *X*, because it is the most likely single answer.

Generally speaking that is what expert systems in computers perform: an expert system is no more than a set of rules and probabilities, the outcome being the most probable solution, with possibly a series of less likely answers.

As we have seen, in the expert system to predict who has a review within the two chosen at random, the 'most likely' answer is often more likely to be wrong than right. However, of all the possible answers, it is least likely to be wrong.

Often, however, the decision from the expert system is also more likely to be right rather than wrong. If a decision has to be made between a restricted range of causes of an illness, it is possible that the expert system can be very useful at predicting the appropriate cause. The success of such an expert system is difficult to assess for an interesting reason.

If I have two points on a graph, I can always draw a straight (two dimensional) line through these two points. With these two points I can draw an infinity of flat (three dimensional) surfaces. If I have three points, I can draw one surface but possibly no straight line, and the extra point is a check on the line. If I have a large number of observations on fewer people, I can always be totally correct in my predictions.

This is why to assess the utility of an expert system, which by its nature is continually being modified to take into account new forms of information, the testing of the system has to take place over a wide variety and number of independent test cases.

Boris Allan

Letter substitution

Puzzle No 130

Here are two alphanumerics in which digits have to be substituted for the letters.

(i) P * (P * C * W) = PCW
(ii) W * (P * C * W) = PCW

There are no prizes to readers of this magazine for identifying what these letters usually mean — but here we are after the digital value of these expressions. There is one answer to the first alphanumeric, but *three* possibilities for the second. What are they?

Solution to Puzzle No 125

Of the 7776 different throws possible with five dice 1811 of them will win. Thus the player will have slightly less than one winning throw in every four.

The program takes each throw in sequence and keeps count of winning and losing throws.

```
10 LET T = 0 LET U = 0 20 FOR A = 1 TO 6 30 FOR B = 1 TO 6 40 FOR C = 1 TO 6 50 FOR D = 1 TO 6 60 FOR E = 1 TO 6 70 LET S = A + B + C + D + E 80 LET P = A * B * C * D * E 90 LET Z = P/S 100 IF Z = INT(Z) THEN LET T = T + 1 110 IF Z <> INT(Z) THEN LET U = U + 1 120 NEXT E,D,C,B,A 130 PRINT T 140 PRINT U 150 PRINT T + U
```

Winner of Puzzle No 125

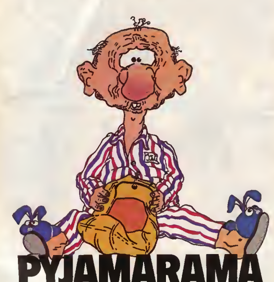
The winner is Carol Huffman, Albany Ct, Brunswick Rd, Earlsdon, Coventry, (using a QL), who receives £10.

Rules

If the puzzle prize can be sensibly solved using a computer, then the winner will have included a listing of the program used to find the correct answer. The closing date for entries to Puzzle No 130 is November 9.

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BRRRRNGG BRRRRNGG
AUTOMATA'S ANSWERING DEVICE HERE PLEASE LEAVE YOUR MESSAGE AFTER THE TONE "BPPTH!"
ULLO 'DEPRESSED' OF BIRMINGHAM 'ERE AGAIN I WAS BORED, SO I THOUGHT I'D CALL YOU I'VE RUINED ME BEST ALICE COOPER LP BY EATIN' COLD BEANS OFF IT. ..
MEANWHILE, INSIDE 'THE COMPUTER',
THE BUGS ARE AFTER ME - I NEED MORE HELP.. THE PIMAN HAS DESERTED ME
MAYBE IF I USE SOME OF THESE CIRCUITS, I CAN GET A MESSAGE TO AUTOMATA
HELLO, MAYDAY, MAYDAY! CALLING AUTOMATA, OR ANYONE - BURT HERE, PURSUED BY RAVENOUS BUGS' HELP!
CAN ANYONE HEAR?
HELLO!
MAYDAY!
..I'M USING ME ONLY PLATE TO CATCH THE DRIPS FROM THE LEAKY ROOF AN'
HELLO MAYDAY' MAYDAY!
ULLO IS THIS STILL THE ANSWERIN' MACHINE AT AUTOMATA?
DID YOU SAY AUTOMATA? WHAT LUCK! NOW LOOK, MORE PEOPLE MUST BUY THIS GAME, AND HELP ME!
EH? WOT GAME?
"PI-IN-'ERE"!
HUH I BET IT'S BORIN EVERYTHIN' IN THE WORLD'S BORIN'
THIS ISN'T AND I NEED HELP! I'VE BEEN SHRUNK, AND INJECTED INTO THE COMPUTER.. MY MISSION IS TO TRACK DOWN THE ELUSIVE "BIG BUG" - BUT NOT ENOUGH PEOPLE ARE BUYING "PI-IN'ERE", AND COMING TO MY AID! BUT WAIT..
IF YOU'RE AUTOMATA, I SHOULDN'T HAVE TO TELL YOU THIS' YOUR LOT PUT ME IN HERE'
NO, I THOUGHT YEW WERE AUTOMATA - I'M 'DEPRESSED' OF BIRMINGHAM
WE CAN SEE YOU, BURT!
BIRMINGHAM, SOME YARDS FROM 'DEPRESSED'S' SMOULDERING HOVEL..
A PYROMANIAC EH? COME ON, SUNSHINE..
LEMME GOW, YOU COPPER! I'M WALTER HOSE FIREMAN!
YER, WELL FIREMEN ARE SUPPOSED TO STOP FIRES, NOT START 'EM! SOME POOR BLOWK LIVES IN THUR!
WE DON'T NEED YOU! MY PINK ELEPHANT WILL BE ALONG ANY MINUTE YOU SEE..
HUH, MUST BE A CROSSED LINE. TYPICAL JUST ONE OF THE BORIN' THINGS THAT FILL MY 24 HOUR DAY NO WINNIN' MILLION POUND BINGO OR AVIN BEAUTIFUL WOMEN TO PROTECT OR FINDIN A COMPLETE ALICE COOPER COLLECTION IN A JUNK SHOP FOR 10P, OR ..SNIFF.. WHATS BURNIN? IT'S ME! ME FLAT'S ON FIRE! MAYDAY!!
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